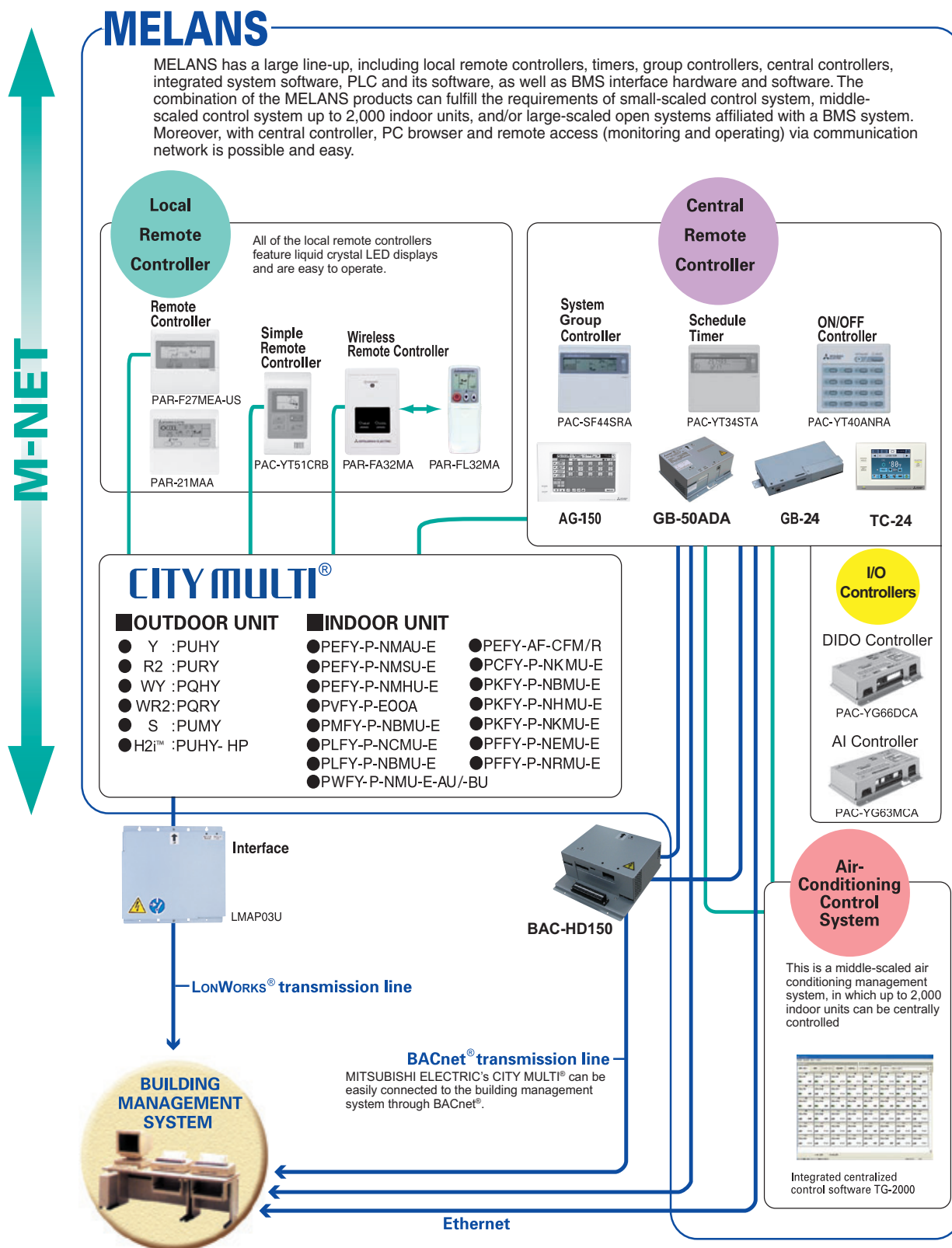


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MITSUBISHI ELECTRIC's Air-conditioner Network System (MELANS)



1. MITSUBISHI ELECTRIC'S AIR-CONDITIONER NETWORK SYSTEM (MELANS)

Model	Local remote controller				AG-150 50 / 50		GB-50ADA 50 / 50		GB-24 24 / 24		TC-24	TG-2000 *4*5 2000 / 2000
	PAR21MAA	PAR-F27MEA	PAC-Y151CRB	PAR-FL-32MAA	AG-150	Browser	GB-50	Browser *4	GB-24	Browser *7		
Controllable Groups/ Indoors (Groups/Indoors)	1 / 16	1 / 16	1 / 16	1 / 16	AG-150	Browser	GB-50	Browser *4	GB-24	Browser *7		
■ Operating												
ON/OFF	○	○	○	○	⊙	⊙	▲	⊙	▲	⊙	⊙	⊙
Mode(cool/heat/ dry/fan)	○	○	○	○	⊙	⊙	N	⊙	N	⊙	⊙	⊙
Temperature	○	○	○	○	⊙	⊙	N	⊙	N	⊙	⊙	⊙
Local Permit/ Prohibit	N	N	N	N	⊙	⊙	N	⊙	N	⊙	⊙	⊙
Fan speed	○	○	○	○	⊙	⊙	N	⊙	N	⊙	⊙	⊙
Air-Flow	○	○	N	○	⊙	⊙	N	⊙	N	⊙	⊙	⊙
■ Status monitoring												
ON/OFF	○	○	○	○	⊙	○	▲	○	▲	○	○	⊙
Mode(cool/heat/ dry/fan)	○	○	○	○	○	○	N	○	N	○	○	○
Temperature	○	○	○	○	○	○	N	○	N	○	○	○
Local Permit/ Prohibit	○	○	○	○	○	○	N	○	N	○	○	○
Fan speed	○	○	○	○	○	○	N	○	N	○	○	○
Air-Flow	○	○	N	○	○	○	N	○	N	○	○	○
Indoor temperature	○	○	N	N	○	○	N	○	N	○	○	○
Filter design	○	○	N	N	○	○	N	○	N	○	○	○
Error flashing	○	○	○	○	○	○	▲	○	▲	○	○	⊙
Error code	○	○	○	N	○	○	N	○	N	○	○	○
Operation hour	N	N	N	N	N	N	N	○	N	○	○	●
■ Scheduling												
One-day	○	○	N	N	N	●	N	●	N	●	●	●
Times of ON/OFF per day	8	1/1	N	1/1	24	24	N	24	N	12	12	12 or 24
Weekly	○	N	N	N	○	●	N	●	N	●	●	●
Times of ON/OFF per week	8x7	N	N	N	24x7	24x7	N	24x7	N	12x7	12x7	12x7 or 24x7
Annual	N	N	N	N	N	●	N	●	N	●	●	●
Auto-off timer	○	○	N	N	N	N	N	N	N	N	N	N
Min. timer setting unit(minute)	1	10	N	10	1	1	N	1	N	1	1	1
■ Recording												
Error record	N	N	N	N	○	○	N	○	N	○	○	○
Daily/monthly report	N	N	N	N	N	N	N	N	N	N	N	⊙
Electricity charge	N	N	N	N	N	N	N	N	N	N	N	●
■ Other												
Temperature-set limitation	○	○	○	N	N	○*2	N	○*2	N	○*2	○*2	○
Auto-lock	○	○	N	N	N	N	N	N	N	N	N	N
■ Management (Group/Interlocked)												
Ventilation interlock	N/O	N/O	N/O	N	○	○/○*2	N	○/○*2	N	○/○*2	○	○/○
Group setting	○*1	○	○*1	N	○	○*2	N	○*2	N	○*2	○	○
Block setting	N	N	N	N	○	○*2	N	○*2	N	○*2	○	○
Revision of electricity charge	N	N	N	N	N	N	N	N	N	N	N	□●
■ Operating on LOSSNAY interlocked (Group/ Interlocked)												
ON/OFF	N/O	N/O	N/O	N/O	⊙/⊙	⊙/⊙	▲/▲	⊙/⊙	▲/▲	⊙/⊙	⊙/⊙	⊙/⊙
Fan speed	N/O	N/O	N	N	⊙/⊙	⊙/⊙	N/N	⊙/⊙	N/N	⊙/⊙	⊙/⊙	⊙/⊙
Ventilation mode	N/N	N	N	N	⊙/N	⊙/N	N/N	⊙/N	N/N	⊙/N	⊙/N	○/N
■ Status monitoring on LOSSNAY interlocked (Group/Interlocked)												
ON/OFF	N/O	N/O	N	N	⊙/⊙	⊙/⊙	▲/▲	⊙/⊙	▲/▲	⊙/⊙	⊙/⊙	⊙/○
Fan speed	N/O	N/O	N	N	○/○	○/○	N/N	○/○	N/N	○/○	○/○	○/○
Ventilation mode	N	N	N	N	○/N	○/N	N/N	○/N	N/N	○/N	○/N	○/N

⊙: Each group/Batched

●: AG-150/GB50ADA license registration possible

▲: Batched handling (for maintenance)

○: Each Group

□: BLOCK (for CITY MULTI Indoor unit, not for all Mr. Slim

N: Not available (not used)

■: BLOCK

△: Batched only

*1 Group setting via wiring between indoor units with cross-over cable;

*2 Installation possible at initial setting web browser;

*3 Inter-lock is set at local remote controller.

*4 AG-150/GB-50ADA license registration to GB-50ADA is required to monitor and operate the units by browser and TG-2000.

*5 AG-150 license registration to AG-150 is required to monitor and operate the units by browser and TG-2000.

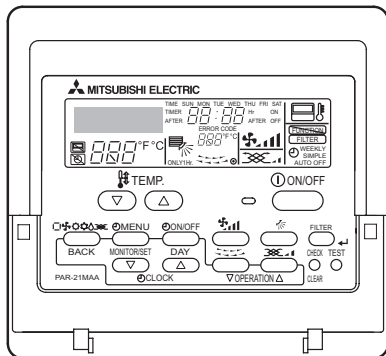
*6 This function can be set only on the remote controller. This function cannot be used with System controller

*7 GB-24 license registration is required to monitor and operate the units by browser.

Specifications are subject to change.

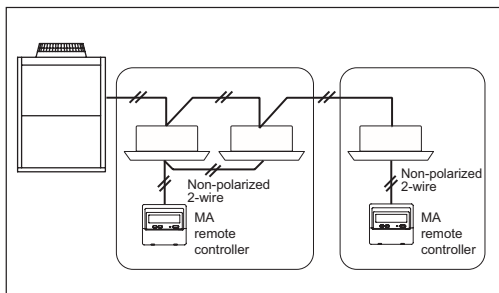
2. LOCAL REMOTE CONTROLLER

2-1. Deluxe MA remote controller [PAR-21MAA]

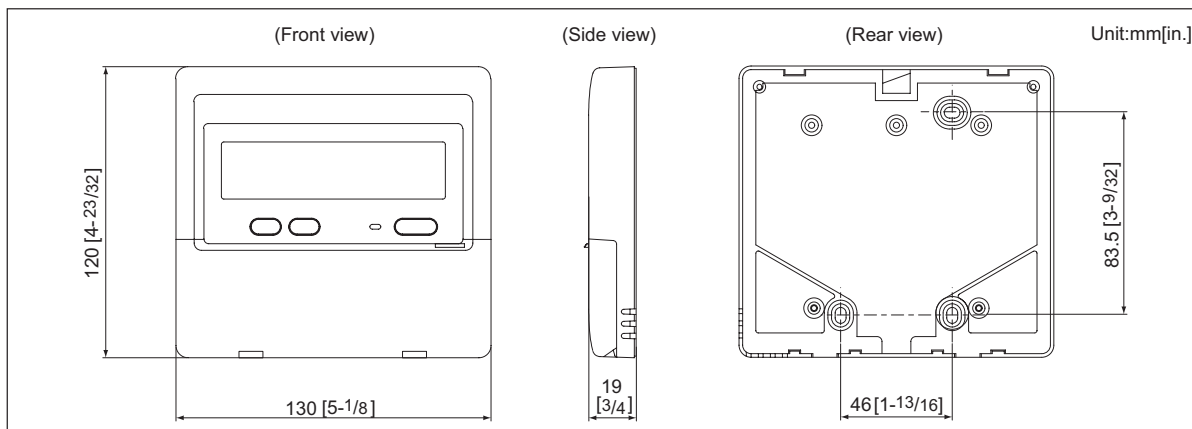


- High-quality white color body and light-green display.
 - Dot LCD is applied.
 - Choose from Japanese, Chinese, English, German, Spanish, Russian, Italian, French displays.
 - Connectable to all CITY MULTI indoor units, and automatically adjust its function with the connected indoor unit.
 - Limiting the temperature setting range is possible.
 - Auto-stop timer is available.
 - Helps to avoid forgetting to turn off the air conditioner.
 - Weekly scheduler is available.
 - ON/OFF/Temperature setting 8 times per day, 1 week scheduling.
 - Grouping via cross-over wire directly.
 - Usable as the local remote controller for system controller (MELANS)
- * Combining ME remote controller and/or LOSSNAY remote controller in a group is not possible.

■ System example



■ External dimension



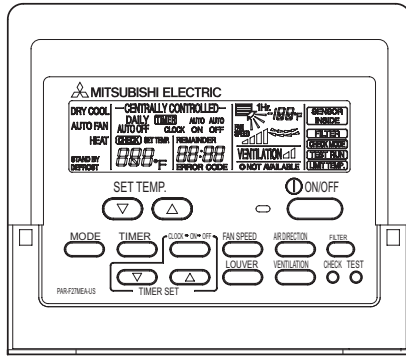
■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective X:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2- and WR2-Series.	○	○
Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) () For PDEFY/PEFY/PEFY/PV/FY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	○	○
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing, Louver ON/OFF Air flow direction settings vary depending on the model.	○	○
Weekly Timer	ON/OFF/Temperature setting can be done up to 8 times one day in the week. The time can be set by the minute.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※1: When the local remote controller inactivation command is received from the master system controller, "E" is displayed.	X	※1 ○
Prohibition/permission of specified mode (Cooling prohibited /heating prohibited /cooling-heating prohibited)	By the setting from System Controller, the operation for the following modes is prohibited. At cooling prohibited : Cool, Dry, Auto, At heating prohibited : Heat, Auto, At cooling-heating prohibited : Cool, Heat, Dry, Auto	X	○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit when the indoor unit is operating.	X	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.	X	□
Test run	This operates air conditioner units in test run mode.	○	○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY. LOSSNAY items that can be set are "Hi" "Low" "Stop". Ventilation mode switching is not available.	○	○
Function to limit the setting range of room temperature (Set temperature range limit)	The range of room temperature setting can be limited by the initial setting. The lowest limit temperature can be made higher than the usual (67°F/19°C) at cooling/drying, while the upper limit temperature lower than the usual (83°F/28°C) at heating.	○	○
Easy-to-operate simplified locking function (Auto lock function)	Setting/releasing of simplified locking for remote control switch can be performed. · Locking of all switches · Locking of all switches except Start/Stop switch	○	○

2. LOCAL REMOTE CONTROLLER

2-2. ME remote controller [PAR-27MEA-US]



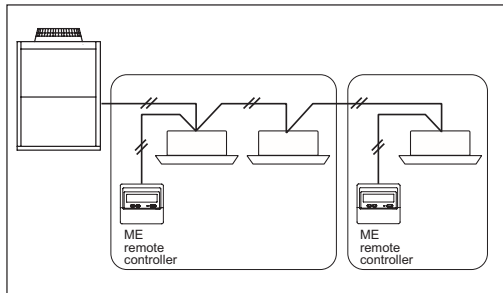
- Three timer modes are available with enhanced function.
- The room temperature can be limited by the initial setting. By setting the room temperature range narrower than usual setting, cooling/heating operation with excessive temperature can be prevented and thus save energy.
- Allows for simple "button locking" function. LCD temperature can be set and displayed in increments of 2 F.

■ Functions

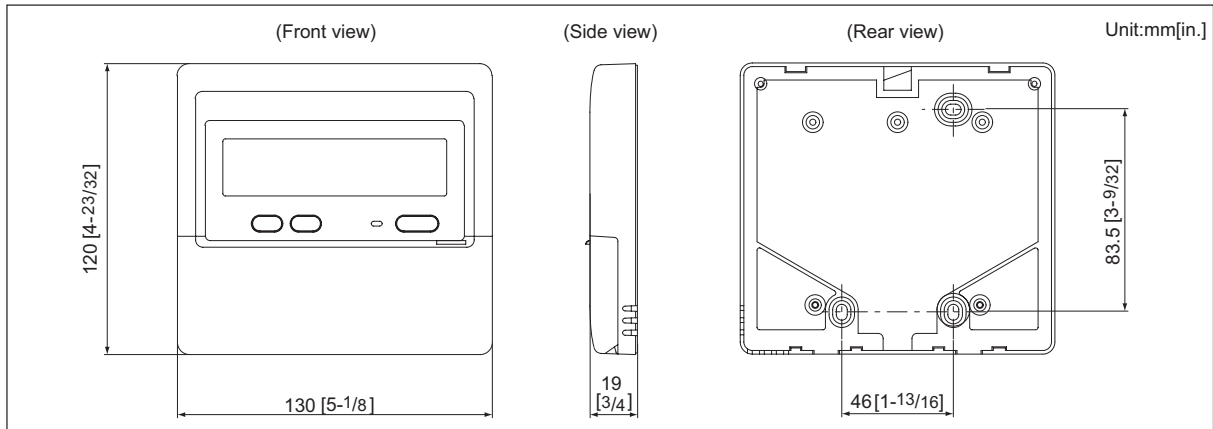
□: Each unit ○: Each group ●: Each block
△: Each floor ◎: Collective X: Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
DRY COOL AUTO FAN HEAT	Switches between Cool / Dry / Auto / Fan / Heat. Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2- and WR2-Series.	○	○
SET TEMP. Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) () For PDPY/PEFY/FFFY/VFVY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	○	○
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing, Louver ON/OFF Air flow direction settings vary depending on the model.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※1: When the local remote controller inactivation command is received from the master system controller, "CENTRALLY CONTROLLED -" is displayed.	X	※1 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit when the indoor unit is operating.	X	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.	X	□
Timer operation	Thanks to the three timer modes equipped, a proper mode can be selected to meet the usage. One day timer : ON/OFF setting of one time on one day can be applied. Daily timer : ON/OFF setting by the One day timer can be repeated for everyday. Auto OFF timer : OFF timer can be set in a range from 30 minutes to 4 hours. ※Setting of Auto OFF timer automatically activates OFF timer at the next operation. This function can be utilized to prevent the negligence of OFF setting. ※Weekly schedule in only one patterns can be employed by connecting Program timer.※2	○	○
Test run	This operates air conditioner units in test run mode.	○	○
Function to limit the setting range of room temperature (Set temperature range limit)	The range of room temperature setting can be limited by the initial setting. The lowest limit temperature can be made higher than the usual (67°F/19°C) at cooling/drying, while the upper limit temperature lower than the usual (83°F/28°C) at heating. ※When making the function to limit room temperature setting range effective, the operation mode cannot be set to the auto mode.	○	○
Easy-to-operate simplified locking function (Auto lock function)	Setting/releasing of simplified locking for remote control switch can be performed. · Locking of all switches · Locking of all switches except Start/Stop switch	○	○

■ System example

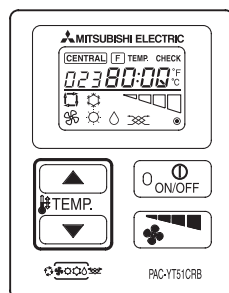


■ External dimension



2. LOCAL REMOTE CONTROLLER

2-3. Simple MA remote controller [PAC-YT51CRB]



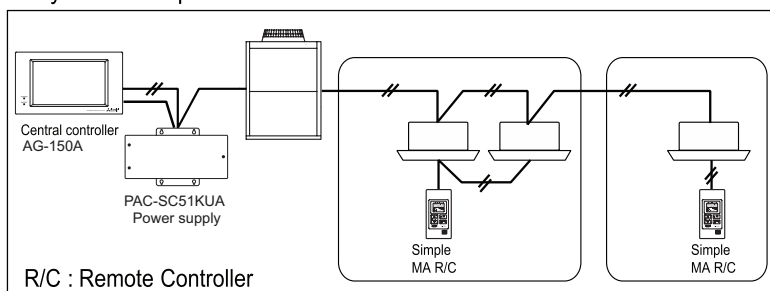
- Control: START/STOP, room temperature, fan speed, and operation mode selection
- The only wiring required is cross-over wiring based on two-wire signal lines.
- Room temperature sensor is built in
- LCD temperature setting and display in 1°C /1°F unit.
- Set temperature range limit
- Can operate all types of indoor units
 - *: If additional features are needed beyond Simple MA PAC-YT51CRB capabilities, use it in conjunction with Deluxe MA PAR-21MAA or Central Controllers AG-150, GB-50ADA or GB-24.
 - Using Simple MA PAC-YT51CRB in combination with PAR-F27MEA-US M-NET Remote Controller is not permitted inside a group.
- Dimensions: 2-3/4 (W) x 4-3/4 (H) x 1-5/8 (D) in.

■ Functions

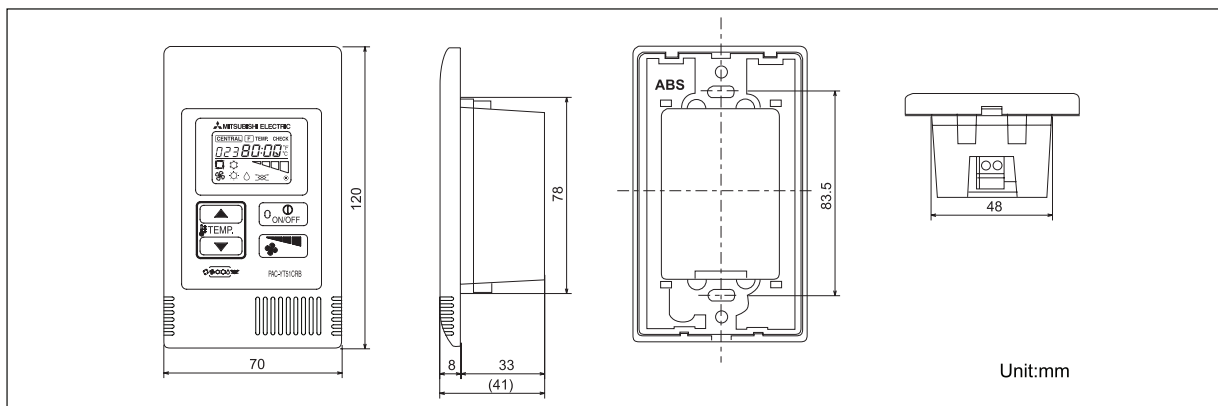
□: Each unit ○: Each group ●: Each block
 △: Each floor ◎: Collective ×: Not available

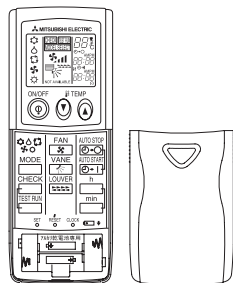
Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. Operation modes vary depending on the air conditioner unit. Auto mode is the CITY MULTI® R2- and WR2-Series only.	○	○
Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) () For PDEFY/PEFY/PFFY/PV/FY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low Fan speed setting varies depending on the model.	○	○
Air flow direction setting	Air flow direction angles (4-angle, Swing) Louver ON/OFF Air flow direction settings vary depending on the model.	×	×
Timer operation	Not available	×	×
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Set temperature). *1: When the local remote controller inactivation command is received from the master system controller, "CENTRAL" is displayed.	×	*1 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	×	×
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.	×	□
Test run	This operates air conditioner units in test run mode. *2: The display for test run mode will be the same as for normal start/stop (no display "test run").	○	*2 ○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY. *3: The interlocked LOSSNAY will be enabled when the indoor unit(s) are enabled. LOSSNAY ON/OFF status is displayed on the Simple MA PAC-YT51CRB. Fan speed and ventilation mode switching are not available through the Simple MA.	*3 ○	*3 ○
Function to limit the setting range of room temp. (Set temperature range limit)	The range of room temperature setting can be limited by the initial setting. The lowest limit temperature can be made higher than the usual (67°F/19°C) at cooling/drying, while the upper limit temperature lower than the usual (83°F/28°C) at heating.	○	○
Prohibition/permission of specified mode /heating prohibited /cooling-heating prohibited)	By the setting from System Controller, the operation for the following modes is prohibited. At cooling prohibited : Cool, Dry, Auto, At heating prohibited : Heat, Auto, At cooling-heating prohibited : Cool, Heat, Dry, Auto	×	○

■ System example

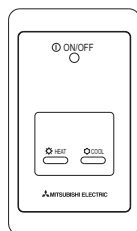


■ External dimension



2-4. Wireless remote controller
[PAR-FL32MA / PAR-FA32MA]

PAR-FL32MA

PAR-FA32MA
(Signal receiving unit)

- It can operate in a group system without requiring address settings.
- When operating, it displays LED lamps. When errors occur, the error code can be shown by the LED flash count.
- *: If an indoor unit with different functionality is operating inside the same group, please note there may be cases when functionality is partially disabled for batch control.
- *: Wireless remote controllers can only be used for a single refrigerant system.
- *: If you use a system controller to centrally control a group, you will need cross-wiring between indoor units when using a wireless remote controller. Also ensure there is no difference between the group setting of the main system controller and the cross wiring across indoor units when wiring and setting cross wires.

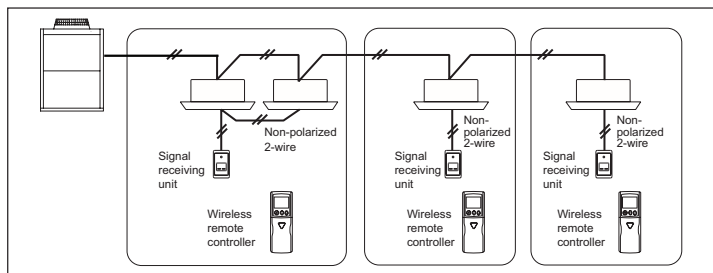
■ Functions

□: Each unit ○: Each group ●: Each block
△: Each floor ◎: Collective X: Not available

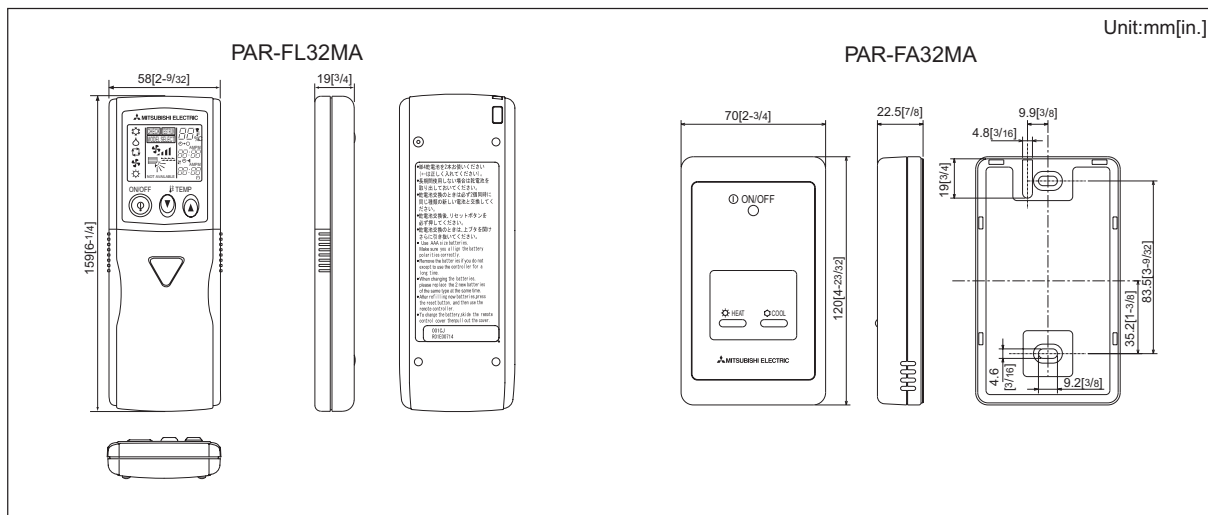
Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
Operation mode switching	Switches between Cool / Dry / Fan / Heat / Auto. Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2- and WR2-Series.	○	○
Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F / 19°C - 30°C Heat : 63°F - 83°F / 17°C - 28°C Auto : 67°F - 83°F / 19°C - 28°C	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 2 air flow speed settings: Hi/Low	*	*
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing. Air flow direction settings vary depending on the model.	*	*
Timer operation	One ON/OFF setting can be set for one day.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※1: If operation is performed when the local remote controller inactivation command is received from the main system controller, a buzzer will ring and an LED will flash.	X	※1 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit when the indoor unit is operating.	X	X
Error	When an error occurs on the air conditioner unit, the operation lamp on the signal receiving unit will flash.	X	○
Test run	This operates air conditioner units in test run mode.	○	○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY.	X	X

*: Some models will have different display for the air flow direction and fan speed.
Set the air flow direction and fan speed when performing initial setting.

■ System example

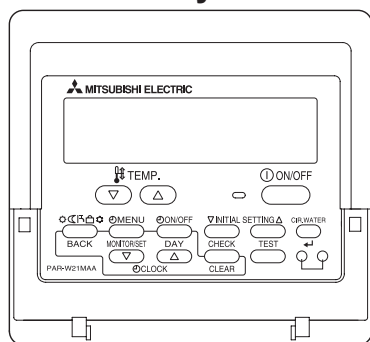


■ External dimension

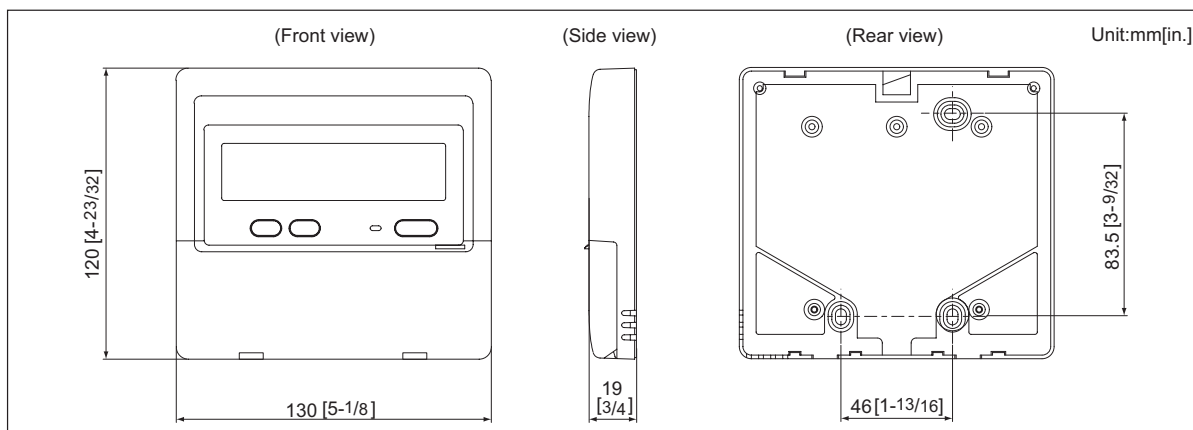


2. LOCAL REMOTE CONTROLLER

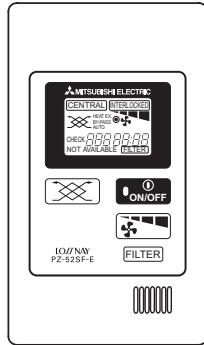
2-5. PWFY Hydronic Heat Exchanger Remote Controller [PAR-21WMAA]



Item	Description	Operations	Display
ON/OFF	Runs and stops the operation of a group of units	○	○
Operation mode switching	Switches between Hot Water / Heating / Heating ECO / Anti-freeze / Cooling * Available operation modes vary depending on the unit to be connected. * Switching limit setting can be made via a remote controller.	○	○
Water temperature setting	Temperature can be set within the ranges below. (in increments of 1°F or 1°C) Hot Water } 95°F (35°C) min. ~ 160°F (71°C) max. (in increments of 2°F or 1°C) Heating } 86°F (30°C) min. ~ 115°F (46°C) max. (in increments of 2°F or 1°C) Anti-freeze } 50°F (10°C) min. ~ 115°F (46°C) max. (in increments of 1°F or 1°C) Cooling } 50°F (10°C) min. ~ 86°F (30°C) max. (in increments of 1°F or 1°C) * The settable range varies depending on the unit to be connected.	○	○
Preset temperature range	Preset temperature range setting can be limited via a remote controller. 50°F (10°C) min. ~ 194°F (90°C) max.	○	○
Water temperature display	(in increments of 1°F or 1°C) * The settable range varies depending on the unit to be connected.	×	○
Permit / Prohibit local operation	Individually prohibits operations of each local remote control function :ON/OFF, Operation modes, water temperature setting, Circulating water replacement warning reset. * Upper level controller may not be connected depending on the unit to be connected.	×	○
Weekly scheduler	ON / OFF / Water temperature setting can be done up to 6 times one day in the week. (in increments of a minute)	○	○
Error	When an error is currently occurring on a unit, the afflicted unit and the error code are displayed.	×	○
Self check (Error history)	Searches the latest error history by pressing the CHECK button twice.	○	○
Test run	Enables the Test run mode by pressing the TEST button twice. * Test run mode is not available depending on the unit to be connected.	○	○
Circulating water replacement warning	Displays the circulating water replacement warning via the unit message. Clears the display by pressing the CIR.WATER button twice. * Circulating water replacement warning is not available depending on the unit to be connected.	○	○
LANGUAGE setting	The language on the dot matrix LCD can be changed. (Seven languages) English/German/Spanish/Russian/Italian/French/Swedish	○	○
Operation locking function	Remote controller operation can be locked or unlocked. ·All-switch locking ·Locking except ON/OFF switch	○	○



2-6. LOSSNAY M-NET remote controller [PZ-52SF]



■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a LOSSNAY unit	○	○
Operation mode switching	Switches between automatic ventilation/ vent - heat interchange/ normal ventilation Note: Operation modes vary depending on the model. When connecting to only models without a damper, these models cannot be used. ("NOT AVAILABLE" will appear in the display.)	○	○
Temperature setting	Not available	×	×
Fan speed setting	Models with 2 air flow speed settings: Hi/Low When only connected to single notch models, this function is disabled.	○	○
Air flow direction setting	Not available	×	×
Timer operation	Not available	×	×
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Reset filter). ※1: When the local remote controller inactivation command is received from a master system controller, "CENTRAL" is displayed.	×	※1 ○
Indoor unit intake temperature	Not available	×	×
Error	When an error occurs on the air conditioner unit, the operation lamp on the signal receiving unit will flash.	×	□
Test run	There is no test run switch for LOSSNAY remote controllers. Set test run on a LOSSNAY by using the test run switch on the LOSSNAY unit. ※2: Cancel by operating the start/stop switch after switching off the LOSSNAY unit test run switch.	※2 ×	○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY.	○	○
Interlocked operation	This is displayed to indicate it is being operated by an operation control unit's external control terminal for an interlocked system that contains LOSSNAY units and indoor units.	×	○

- Stand-alone LOSSNAY operation is possible by commands from a centralized controller or LOSSNAY remote controller. (AG-150/GB-50ADA/GB-24/TC-24 are centralized controllers that support LOSSNAY operation.)

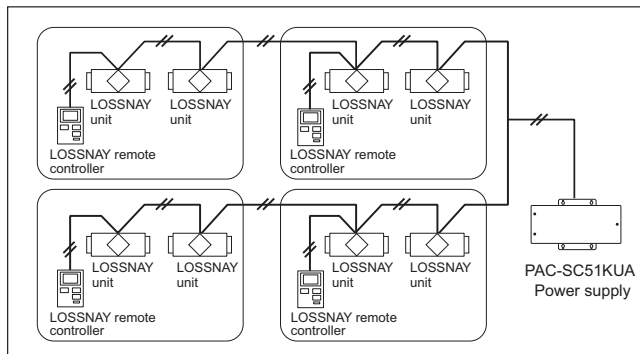
- The LOSSNAY remote controller is capable of changing the air flow and vent modes.

- All the wiring is cross-wiring that uses non-polar two wire system signal cables.

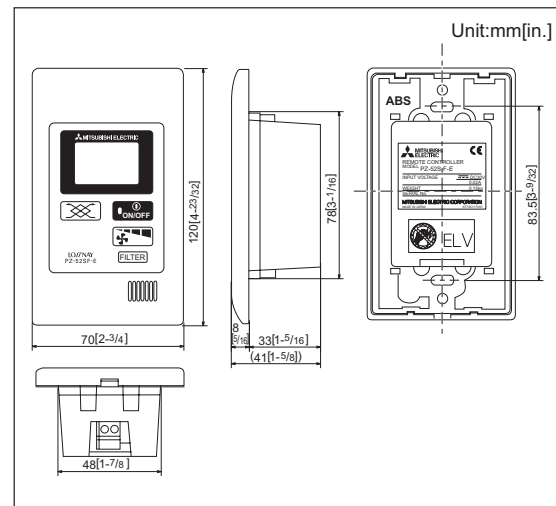
※ : When setting up a LOSSNAY stand-alone system or when setting up a LOSSNAY and centralized controller system, connect a power supply unit for the signal cables.

※ : It is impossible to use a LOSSNAY remote controller for LOSSNAY unit that is interlocked with other indoor units (except for some models).

■ System example

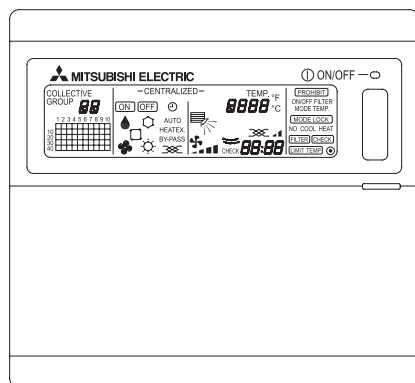


■ External dimension



3. SYSTEM CONTROLLER

3-1. System group controller [PAC-SF44SRA]



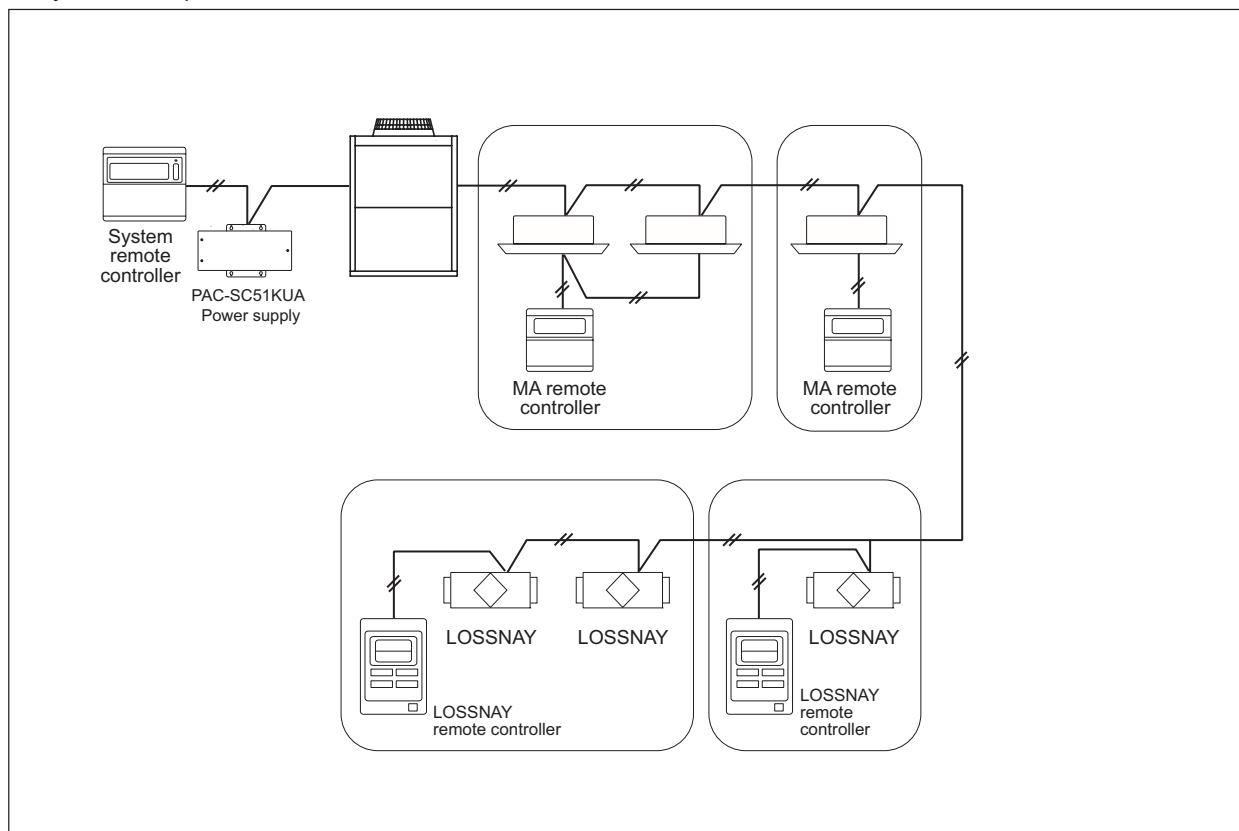
- 50 groups/50 units of air conditioners can be controlled.
- Up to 50 groups/50 units of air conditioners can be operated with one system group controller.
- Operation status displayed on easy-to-read LCD
- The group currently operating can be seen at a glance with the operation status display for each group.
- Schedule operation is available
- Groups of air conditioners are available for operation at a set schedule using the Schedule timer (PAC-YT34STA).
- Independent LOSSNAY operation is possible
- LOSSNAY units can be grouped the same as the Central remote controller and ON/OFF remote controller.
- "Automatic ventilation", "Normal ventilation" and "Ventilation with heat exchanger" can be switched from the system controller.

■ Functions

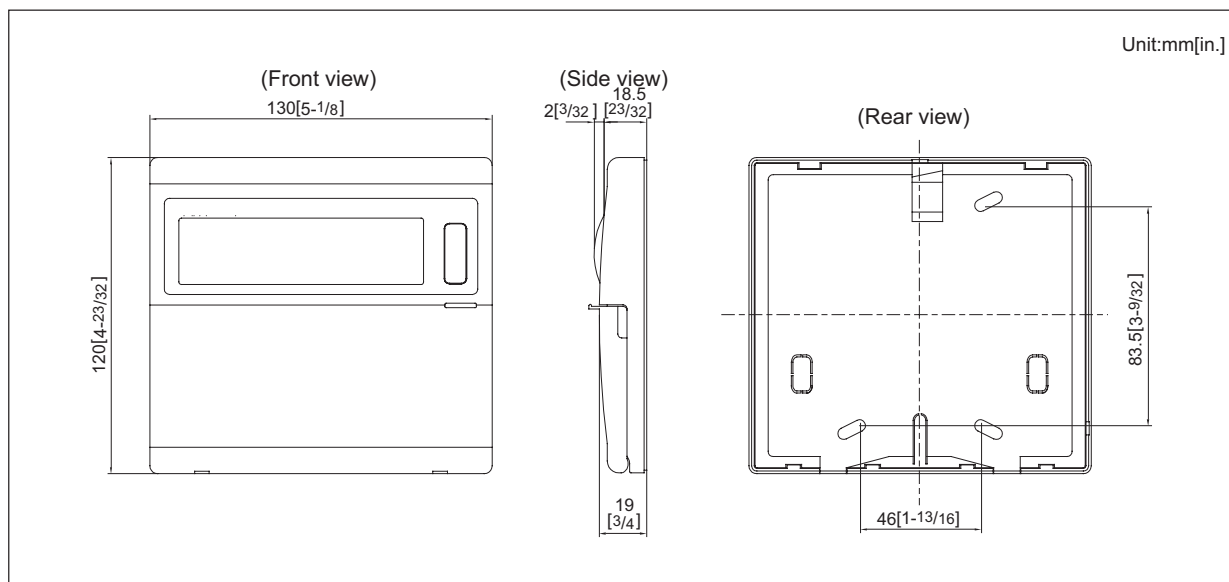
□: Each unit ○: Each group ●: Each block
 △: Each floor ◎: Group or collective X: Not available

Item	Remarks	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	◎	◎
Operation mode switching	Switches between Cool / Dry / Auto*/ Fan / Heat. * There are modes that cannot be selected depending on the unit. * Auto only supported for the CITY MULTI® R2- and WR2-Series.	◎	○
Temperature setting	The temperature can be set within the following range. Values in parentheses are for the medium-temperature indoor unit. Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) () For PDEFY/PEFY/PFFY/PVFY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	◎	○
Fan speed setting	The fan speed cannot be set.	◎	◎
Air flow direction setting	The air flow direction cannot be set.	◎	◎
Manual operation prohibit/permit (ON/OFF, mode change, setting temperature, filter reset)	The ON/OFF, operation mode, setting temperature and filter sign reset operations using the local remote controllers can be prohibited. * [PROHIBIT] will appear when prohibited. Only ON/OFF and filter reset can be prohibited for the LOSSNAY group.	◎	◎
Specific mode operation prohibit (Cooling prohibit, heating prohibit, cooling/heating prohibit)	Operation of the following modes with the local remote controllers can be prohibited. When cooling is prohibited: Cooling, dry, automatic can not be chosen. When heating is prohibited: Heating, automatic can not be chosen. When cooling/heating is prohibited: Cooling, dry, heating, automatic can not be chosen.	◎	◎
Room temperature display	The room temperature cannot be displayed.	—	X
Error display	The details of the currently occurring error are displayed with the address. * The address may not be displayed depending on the details of the error.	—	◎
Schedule operation	Ten patterns of weekly schedules can be operated with the Schedule timer.(PAC-YT34STA) * The schedule validity can be set for each group.	△	△
Ventilation (independent)	Group operation of only the free plan LOSSNAY is possible. * The operation mode of these groups is automatic ventilation, ventilation with heat exchanger and normal ventilation.	○	○
Ventilation (interlocked)	The LOSSNAY will run in interlock with the operation of indoor unit. * The fan rate and mode cannot be changed. The LED will turn ON during operation after interlocking.	△	△

■ System example

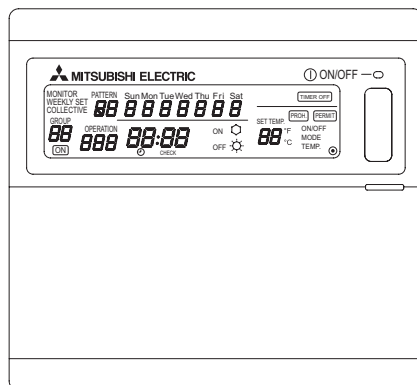


■ External dimension



3. SYSTEM CONTROLLER

3-2. Schedule timer [PAC-YT34STA]



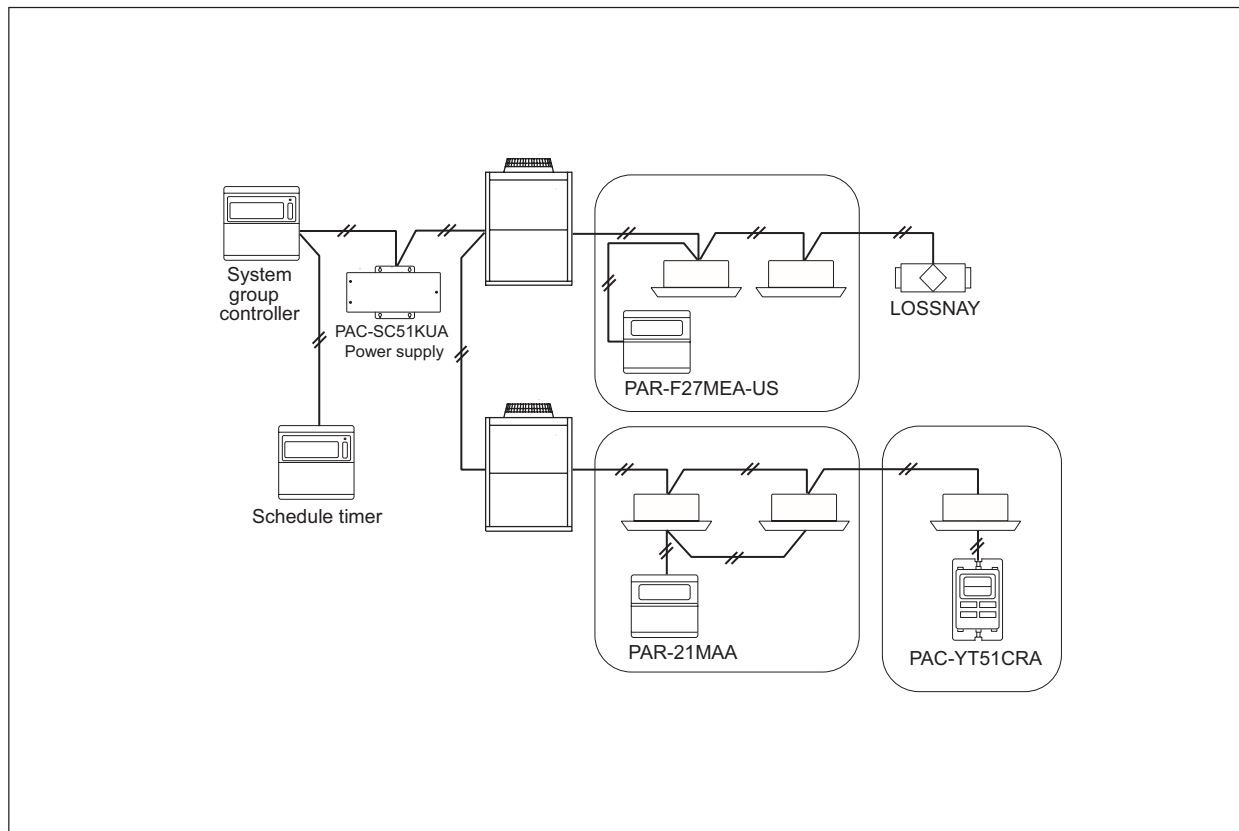
- The weekly schedule of up to 50 groups/50 units can be controlled with one schedule timer.
- The weekly schedule of up to ten patterns (no setting + nine patterns) is available for setting.
- "ON/OFF", "Operation Prohibit", "COOL /HEAT" and "Set Temperature" can be scheduled with up to 16 settings in one pattern.
- It can be connected to the centralized control transmission line or to the indoor/outdoor transmission line without the power supply unit. It is non-polar 2-wire.
- It can be interlocked with a building management system using the external input/output managing function.
- An error unit address and error code appear on the display in case of malfunction happening.

■ Functions

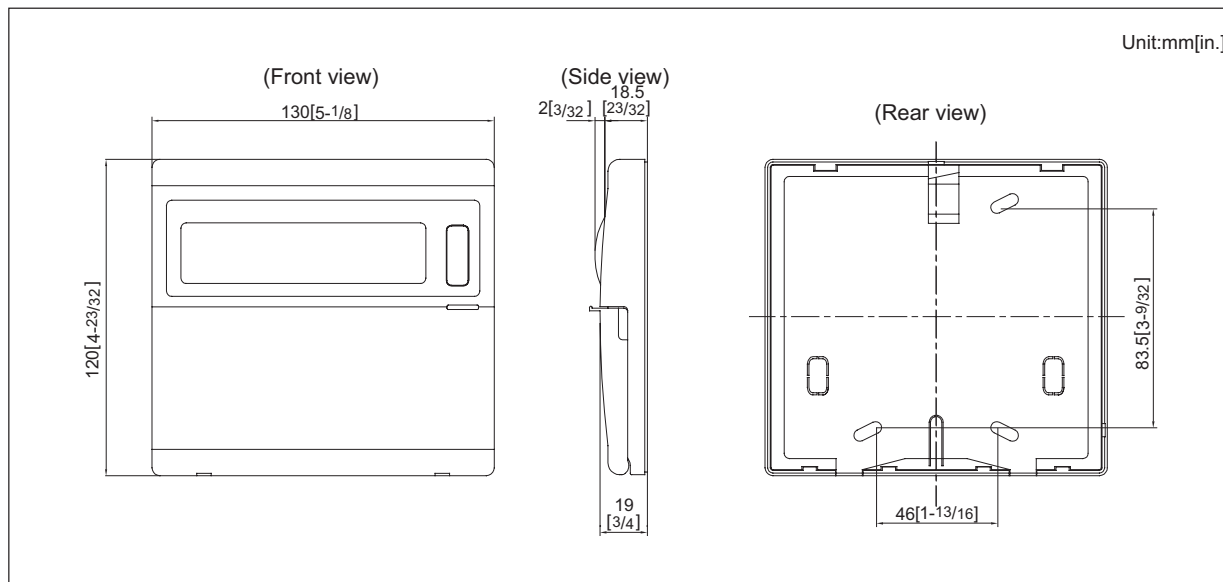
□: Each unit ○: Each group ●: Each block
 △: Each floor ◎: Group or collective X: Not available

Item	Description	Operations	Display
Unit control	50 units/50 groups (Maximum 16 units connected in one group)	◎	○
Schedule control	One week	○	○
Operation	ON/OFF	○	○
	Timer reset	○	○
Schedule function	Setting details ON/OFF COOL/HEAT/AUTO Room temperature setting (19°C to 28°C/67°F to 83°F) Operation prohibit (ON/OFF, operation mode, setting temperature)	○	—
	Number of settings Number of setting patterns: Ten (no setting + nine patterns) (Operation for a week can be set by selecting one of ten patterns for each day.) Number of operations: Up to 16 operations can be set in one pattern	○	—
	Time setting unit	○	—
Display	Current time and day	—	○
	Error state	—	○
	Unit operation state	—	X
External input (Timer connection, emergency stop input, etc.)	The following can be input with the level signals or pulse signals. Level signal: "Emergency stop input" or "Collective ON/OFF" Pulse signal: "Collective ON/OFF" or "Local remote controller prohibit/permit" One input can be selected from those above.	◎	—
External output (Error output, operation output)	"ON/OFF" and "error/normal" are output with the level signal. *: The optional output cable is required.	—	◎

■ System example

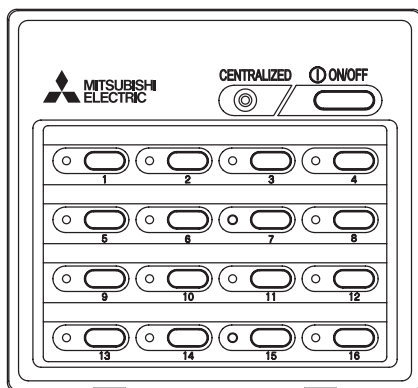


■ External dimension



3. SYSTEM CONTROLLER

3-3. ON/OFF controller [PAC-YT40ANRA]



- 16 groups/50 units can be controlled.
 - Up to 16 groups/50 units can be operated with one ON/OFF remote controller.
 - A general-purpose interface is available for control, so general devices can also be turned ON and OFF.
- Just press a switch to start.
 - All of the units can be started and stopped by pressing the main switch, and each unit in the group can be started and stopped with individual switches.
- LED flashing during failure.
 - If any error should occur in the air conditioner, its details can be confirmed easily with the flashing LED. The LED also indicates whether each group is running or stopped.
- Interlock operation with external system possible.
 - It can be flexibly interlocked with a card reader, or building management system, etc., using the incorporated external input/output function.
- Flexible group setting.
 - The groups can be easily configured, so the group pattern can be freely set according to the layout.
 - The ON/OFF controller can be connected at the indoor/outdoor transmission line without the power supply unit.

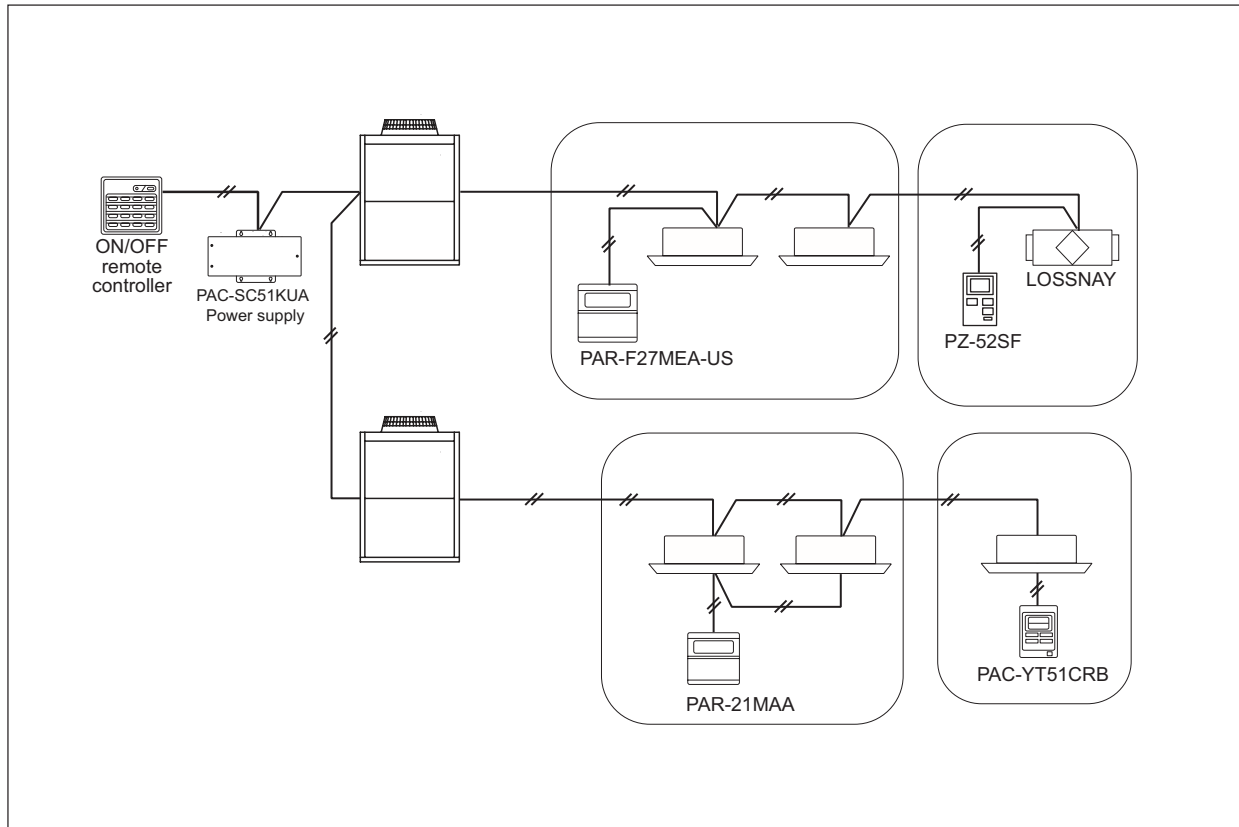
■ Functions

□: Each unit ○: Each group ●: Each block
 △: Each floor ◎: Group or collective X: Not available

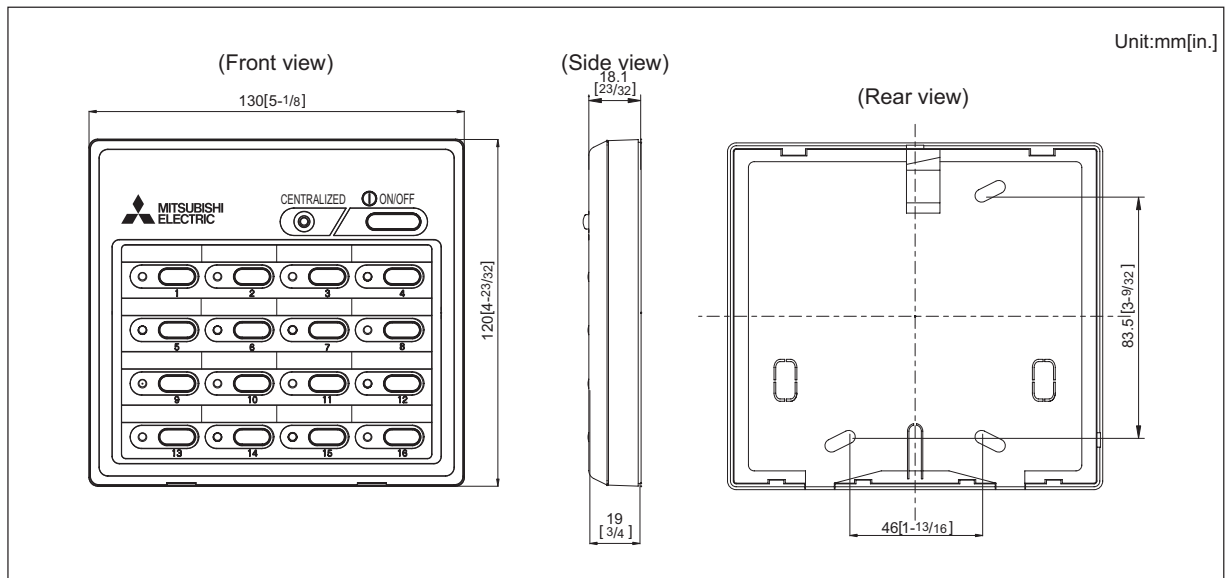
Item	Description	Operations	Display
ON/OFF	ON and OFF operation for the air conditioner units	◎	◎
Operation mode switching	Not available	X	X
Temperature setting	Not available	X	X
Fan speed setting	Not available	X	X
Air flow direction setting	Not available	X	X
Manual operation prohibit/permit (ON/OFF, operation mode, setting temperature, filter reset)	Compatible only with external input.	X	X
Specific mode operation prohibit (Cooling prohibit, heating prohibit, cooling/heating prohibit)	Not available	X	X
Room temperature display	Not available	—	X
Error display	LED flashes during failure. (The error code can be confirmed by removing the cover.)	—	△
Schedule operation	Not available	X	X
Ventilation operation (independent)	Group operation of only LOSSNAY units possible. ※ Only ON/OFF of group.	○	○
Ventilation operation (interlocked)	The LOSSNAY will run in interlock with the operation of indoor unit. ※ The fan rate and mode cannot be changed. The LED will turn ON only during operation after interlocking.	△	△
External input (Timer connection, emergency stop input, etc.)	The following can be input with the level signals or pulse signals. Level signal: "Emergency stop input" or "Collective ON/OFF" Pulse signal: "Collective ON/OFF" or "Local remote controller prohibit/permit" One input can be selected from those above.	◎	—
External output (Error output, operation output)	"ON/OFF" and "error/normal" are output with the level signal. ※ The optional output cable is required.	—	◎

3. SYSTEM CONTROLLER

■ System example



■ External dimension



3. SYSTEM CONTROLLER

3-4. Touch controller [TC-24]



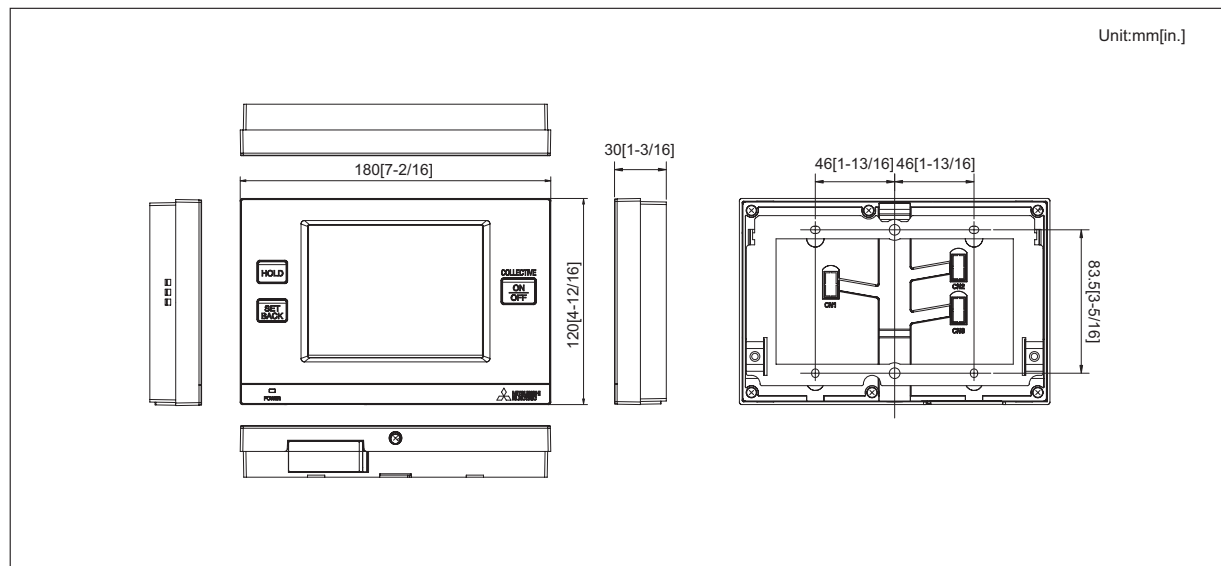
- TC-24 features a 5 inch wide color LCD touch panel. The settings for air conditioning units can be changed by touching the corresponding icons on the display. On the panel of TC-24 are 3 buttons; ON/OFF, SET BACK and HOLD enabling simple and quick operation.
- One TC-24 can control up to 24 groups/units of air conditioners.
- Operation status displayed on easy-to-read LCD. The group currently operating can be seen at a glance with the operation status display. TC-24 operation is limited to basic functions such as ON/OFF, Operation mode changeover, temperature setting and Prohibit operation by local remote controller.
- Up to 12 patterns of weekly schedule can be set. "ON/OFF", "Operation mode", "Set Temperature", "Fan speed", "Air flow direction" and "Prohibit local operation" can be scheduled with up to 16 settings in one pattern.
- Up to 5 patterns of today's schedule can be set.
- Independent LOSSNAY operation is possible. Automatic ventilation, Normal ventilation and Ventilation with heat exchanger can be switched from the system controller.
- TC-24 is equipped with a system changeover function which an operation mode can be switched to an optimal mode depending on indoor temperature setting and target temperature of each group or a representative indoor unit.

■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Group or collective ×:Not available

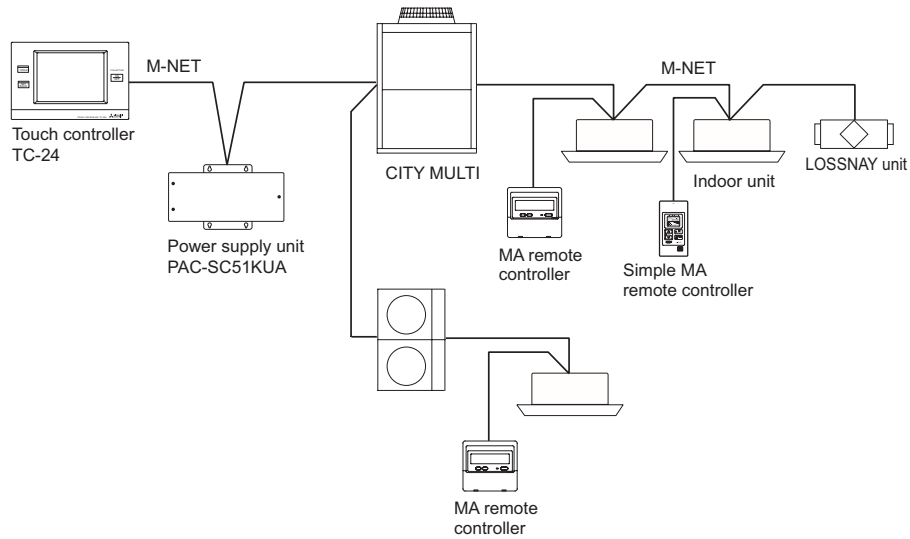
Item	Description	Operations	Display
ON/OFF	ON and OFF operation for the air conditioner units. Even when only a single indoor unit connected to the group remote controller will operate and collective ON/OFF lamp will light up.	◎	◎
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat / Set back. Operation modes vary depending on the air conditioner unit. Auto mode is for CITY MULTI R2 and WR2 series only.	◎	◎
Temperature setting	The temperature can be set within the following range. Cool/Dry : 19°C - 30°C / 67°F - 87°F Heat : 17°C - 28°C / 63°F - 83°F Auto : 19°C - 28°C / 67°F - 83°F Setback : [Upper limit] 19°C-30°C [21°C-30°C] / 67°F-87°F [69°F-87°F] [Lower limit] 12°C-26°C [17°C-26°C] / 53°F-79°F [63°F-79°F] * [] in case of using Mr.SLIM units. * Set temperature range varies depending on the indoor unit model.	◎	◎
Fan speed setting	Models with 5 air flow speed settings: Hi/Mid-2/Mid-1/Low, Auto Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low * Fan speed setting (including Auto) varies depending on the model.	◎	◎
Air flow direction setting	Air flow direction angles 4-angle or 5-angle, Swing, Auto Louver ON/OFF * Air flow direction settings vary depending on the model.	◎	◎
Hold	Prohibits the scheduled operation from being executed. Prohibit operation of local remote controller (ON/OFF, operation mode, set temperature).	◎	◎
Permit / Prohibit	The ON/OFF, operation mode, setting temperature and filter sign reset operations using the local remote controllers can be prohibited. Only ON/OFF and filter reset can be prohibited for the LOSSNAY group.	◎	◎
Operation lock	Child proof. (ON/OFF, operation mode, setting temperature, fan speed, HOLD)	◎	◎
Room temperature display	The room temperature can be displayed.	×	○
Error display	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed. * When an error occurs, the "ON/OFF" LED flashes. The operation monitor screen show abnormal icon over the unit. The error log monitor screen shows the abnormal unit address and error code. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection.	×	□ ◎
Schedule operation	Weekly schedule setting up to 12 pattern is available. In one pattern, up to 16 setting of "ON/OFF", "Operation mode", "Set Temperature", "Fan speed", "Air flow direction" and "Prohibit local operation" can be scheduled. Today's schedule setting up to 5 pattern is available. * Time setting unit: 5 minute / unit	○	○
Ventilation (independent)	Switches the mode "Bypass/Heat recovery/Auto" for LOSSNAY groups.	◎	◎
Ventilation (interlocked)	The LOSSNAY will run in interlock with the operation of indoor unit. The mode cannot be changed. The LED will turn ON during operation after interlocking.	◎	◎
Temperature-set limitation	Batch-setting to temperature range limit at cooling, heating, and auto mode. This function cannot be used with the MA remote controller. (Depends on the indoor unit model.)	◎	◎
System changeover	Operation mode can be switched to an optimal mode depending on indoor temperature setting and target temperature of each group or a representative indoor unit. * When this function is used, the system changeover function of the outdoor unit cannot be used.	●	—
External input (Emergency stop input, etc.)	The following input with level signals or pulse signals are available. Level signal: "Emergency stop input" or "Collective ON/OFF" Pulse signal: "Collective ON/OFF" or "Local remote controller prohibit/permit" One input can be selected from those above. * An external input/output adapter (PAC-YT41HAA (sold separately)) is required. Relays and DC power supply or other devices must be prepared at the site.	◎	◎
External output (Error output, operation output)	"ON/OFF" and "error/normal" are output with the level signal. * An external input/output adapter (PAC-YT41HAA (sold separately)) is required. Relays and DC power supply or other devices must be prepared at the site.	◎	◎

■ External dimension

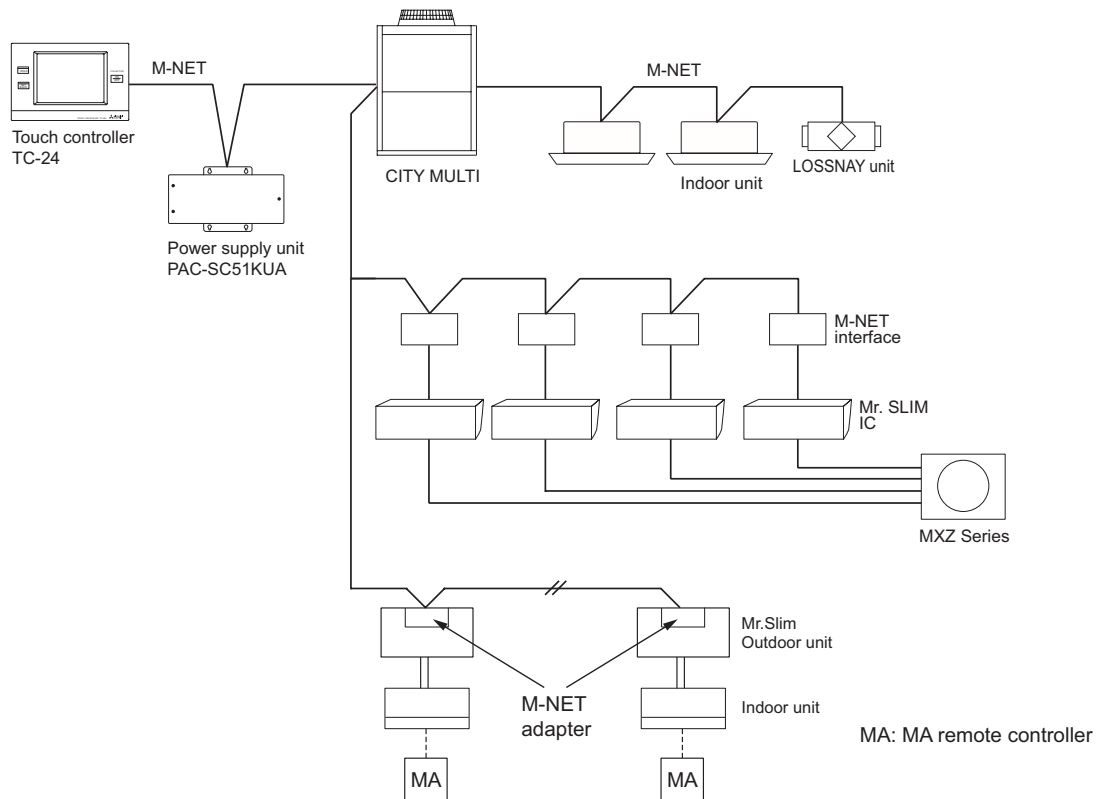


■ System example

(1) Connection with CITY MULTI units



(2) Connection with CITY MULTI and Mr.SLIM units



3. SYSTEM CONTROLLER

1. Power supply to TC-24

TC-24 needs DC power supply of M-NET (24~32VDC) for centralized control transmission use, operation.

(1). Power supply of M-NET from power supply unit PAC-SC51KUA.

Power supply unit PAC-SC51KUA is recommended for TC-24. See the diagram below; for details, please refer to the installation manual of Power supply unit PAC-SC51KUA

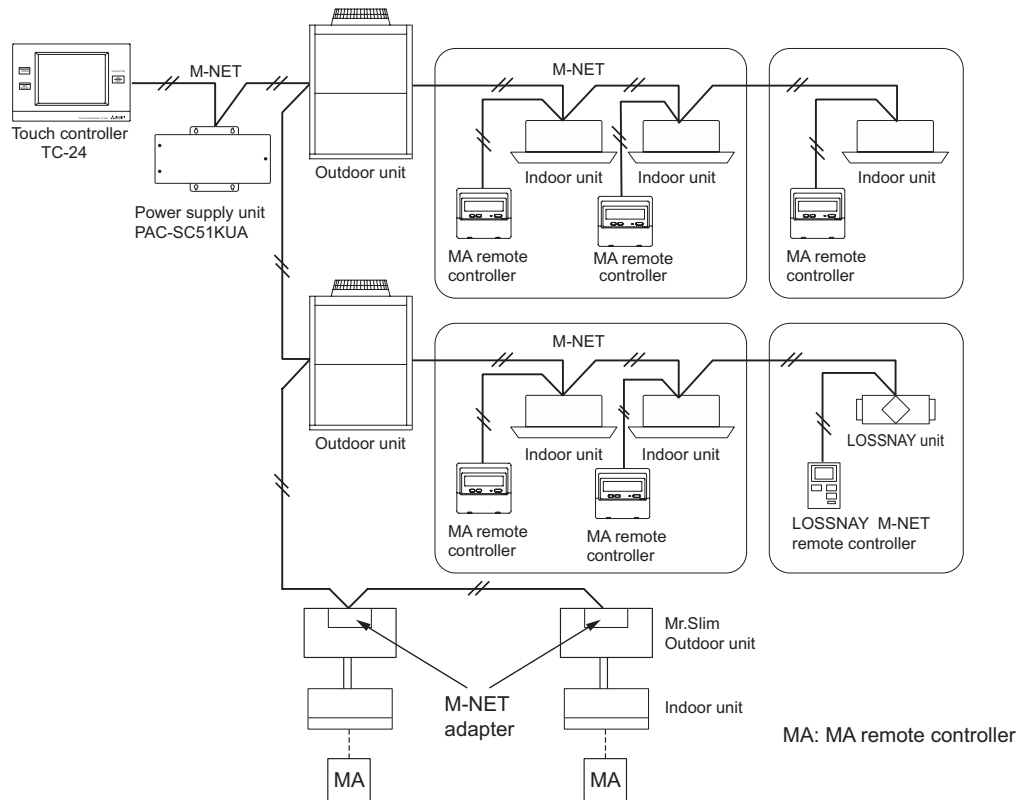


Fig. 1 Basic structure of TC-24 and PAC-SC51KUA

(2). Power supply of M-NET from outdoor unit connector TB7.

As shown on Fig. 2, TC-24 receives power supply of M-NET from R410A outdoor unit connector TB7. In case one of the outdoor units should change its power supply, switch CN41 to CN40.

*NOTE: This method applies to R410A CITY MULTI outdoor unit except PUMY (S series)

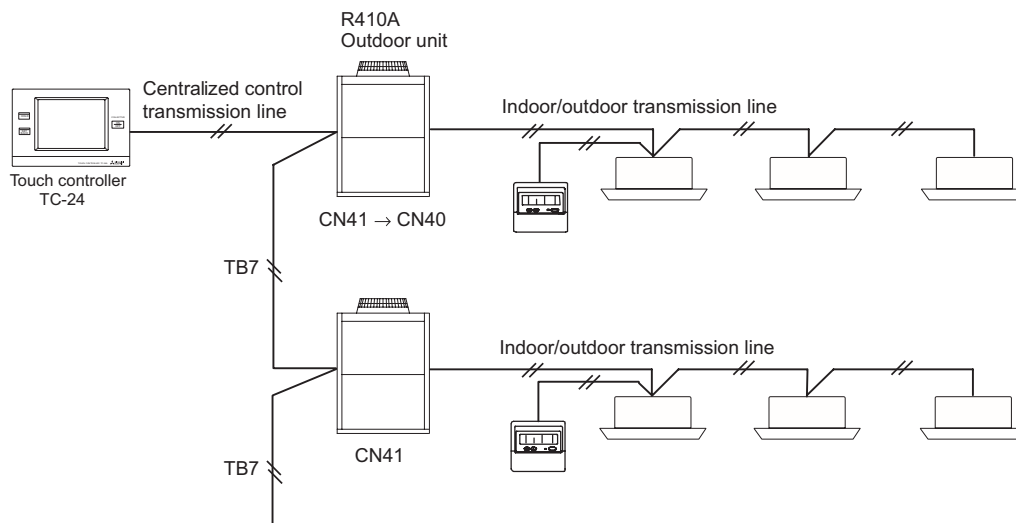


Fig. 2 TC-24, TB7 scheme

(3) Power supply of M-NET from outdoor unit connector TB3.

TC-24 can also receive power supply from R410A/R407C/R22 outdoor unit connector TB3. However, if the outdoor unit shuts down, TC-24 will also automatically shut down. Therefore, this scheme is not recommended for air conditioning system consisting of multiple outdoor units.

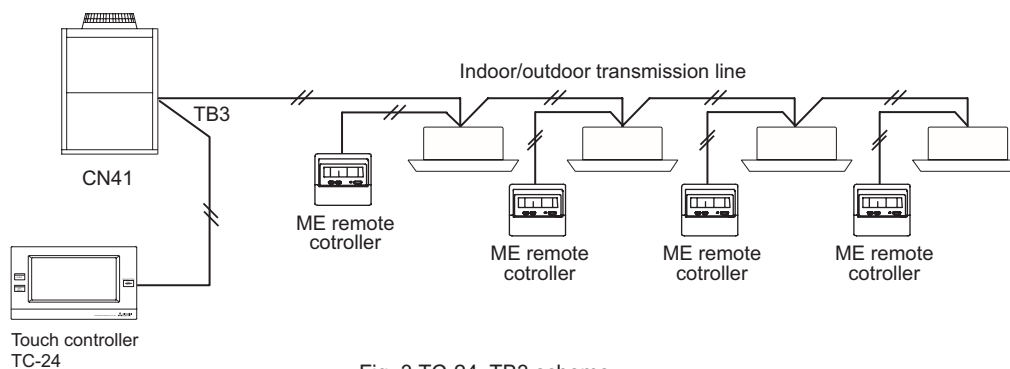
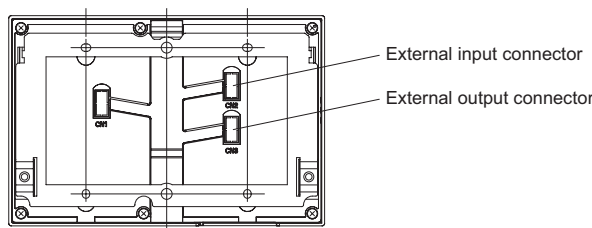


Fig. 3 TC-24, TB3 scheme.

3. SYSTEM CONTROLLER

2. External input/output usage



(1). External signal input function

※ External signal input requires the external I/O adapter (Model: PAC-YT41HAA) sold separately.

1). External input

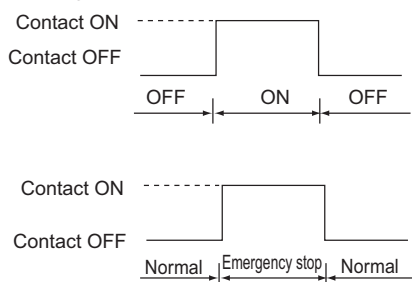
External no-voltage contact signal can be used to send signals indicating the following status of all air conditioning units that are controlled : Emergency stop/Normal, ON/OFF, and local remote controller operation Prohibit/Permit.

The above settings can be made using the external input setting on the Initial Setting screen accessed from the Service Menu screen.

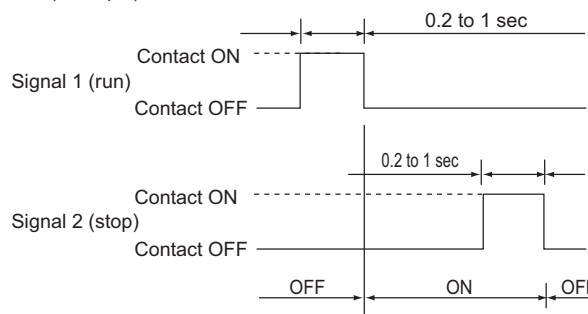
No	External signal input function	Remarks
1	Do not use external input signal (factory setting)	
2	Execute emergency stop/normal with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operation and prohibit/enable change operations will be prohibited during emergency stop.
3	Perform ON/OFF with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operations and prohibit/enable change operations will be prohibited.
4	Perform ON/OFF, prohibit/enable with pulse signals.	Set the pulse width while the contact is ON to 0.2 to 1 sec.

2). Level signal and pulse signal

(A) Level signal



(B) Pulse signal (Example) for ON/OFF



※ The prohibit/enable input is the same.

3). External input specifications

CN2	Lead wire	Emergency stop/normal level signal	ON/OFF, level signal	ON/OFF, prohibit/enable pulse signal
No.1	Green	Built-in power supply for external input (DC5V)		
No.2	Yellow	Emergency stop/normal input	ON/OFF input	ON input
No.3	Orange	Not used	Not used	OFF input
No.4	Red	Not used	Not used	Local remote controller operation prohibit input
No.5	Brown	Not used	Not used	Local remote controller operation enable input

(A) For level signal

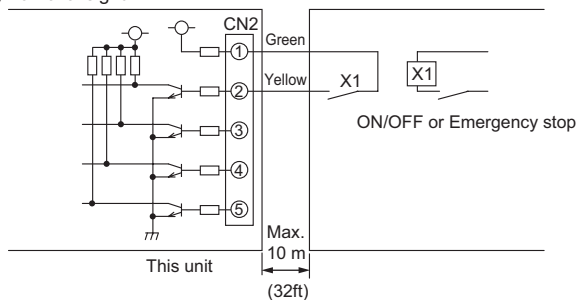
- ① When the emergency stop/normal signal is selected, the status will change from normal to emergency stop when the external input signal contact changes from OFF to ON, and will change from emergency stop to normal when the contact changes from ON to OFF. Emergency stop signal will bring the air conditioners to stop, and canceling the emergency stop will not automatically reset these units. To go back to the previous operation status, they must be manually turned back on.
- ② When the ON/OFF signal is selected, the status will change from OFF to ON when the external input signal contact changes from OFF to ON, and will change from ON to OFF when the contact changes from ON to OFF.

(B) For pulse signal

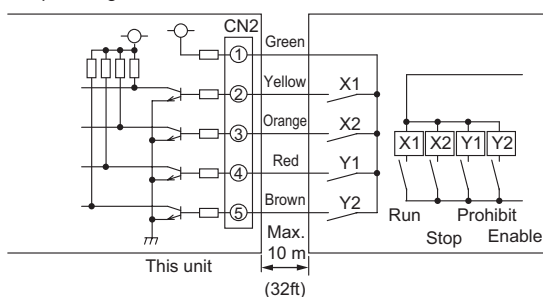
- ① Even if the ON signal is input during ON, the status will remain ON.
- ② If the local remote controller is prohibited, the ON/OFF operation mode and temperature setting operations by the local remote controller will be prohibited.
- ③ Set the pulse width (contact ON time) to 0.2 to 1 sec.

4). Recommended circuit example

(A) For level signal



(B) For pulse signal



- ① The relays and extension cables, etc. must be prepared separately at the site.
- ② Use a no-voltage contact and minute load relay (minimum application load 5VDC-1mA).
- ③ The length of the connection cable extension should not exceed 10 m (32 ft). (Use a cable of 0.3 mm² (22 AWG) or thicker.)
- ④ Cut of the cable not being used close the connector and properly insulate the cut off ends with tape or the like.

(2). External signal output function

※ External signal output requires the external I/o adapter (Model: PAC-YT41HAA) sold separately.

1). External output

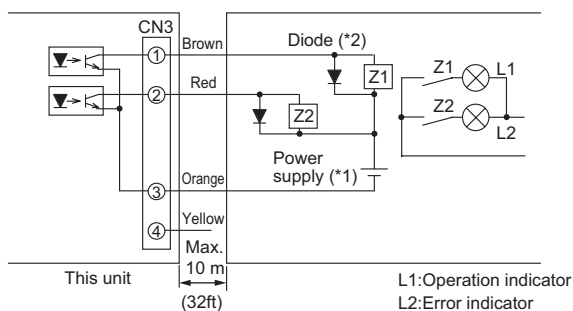
When one or more air conditioners are running, the "ON" signal will be output and if a malfunction occurs in one or more air conditioners, the "Malfunction" signal will be shown.

2). External output specifications

CN 3	Lead wire	Details of each terminal
No.1	Brown	ON/OFF
No.2	Red	Malfunction/normal
No.3	Orange	Common (External ground)
No.4	Yellow	

① " ON" signal and " Malfunction" signal will both be output.

3). Recommended circuit example



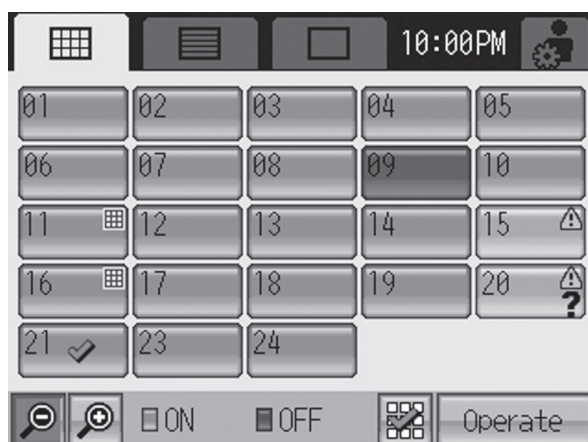
Use Z1 and Z2 relays having the following specifications.

Operation coil
Rated voltage :12VDC,24VDC
Power Consumption : 0.9W or less
(*1)Prepare a power supply separately according to the relay being used. (12VDC or 24VDC)
(*2)Always insert a diode on both ends of the relay coil.

- ① Each element will turn on while ON operation or a malfunction occurs.
- ② The connection cable can be extended up to 10m (32ft).
- ③ The relays, lamps, diodes and extension cables, etc. must be prepared separately at the site.

3. SYSTEM CONTROLLER

3. Screens of TC-24



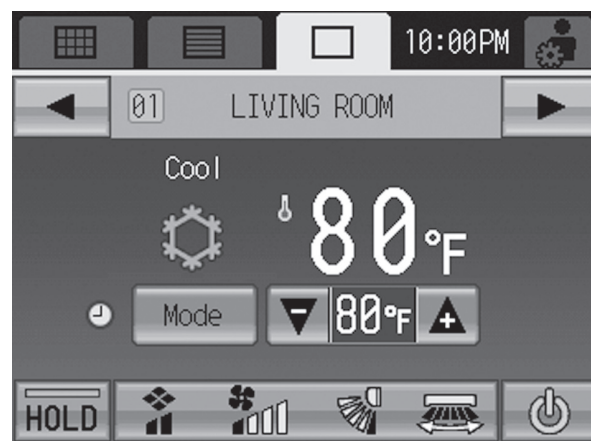
GRID (S)



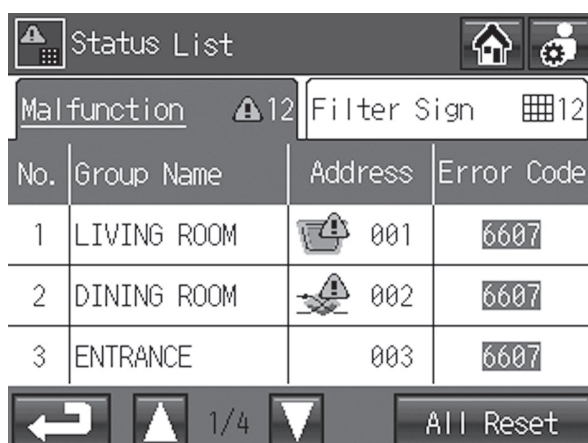
GRID (L)



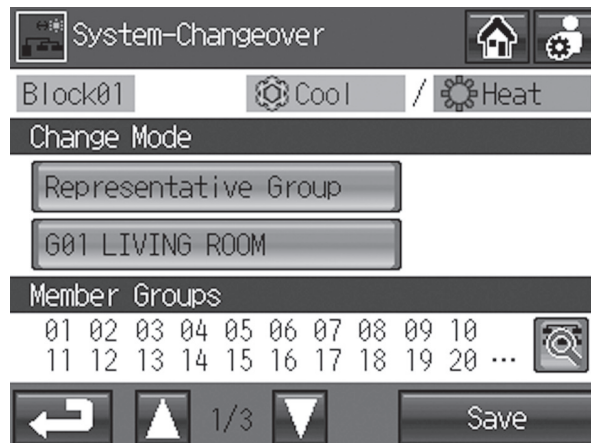
LIST



GROUP



Status List

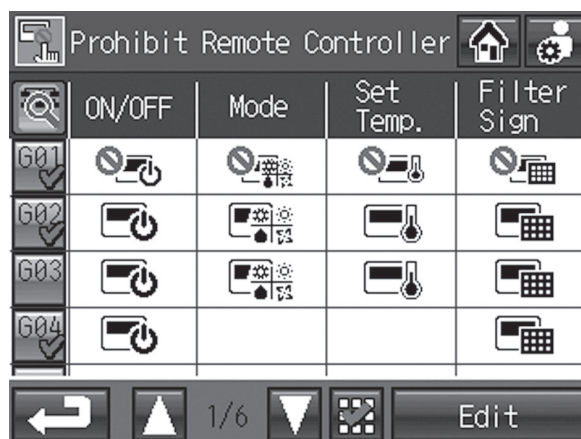


System-Changeover

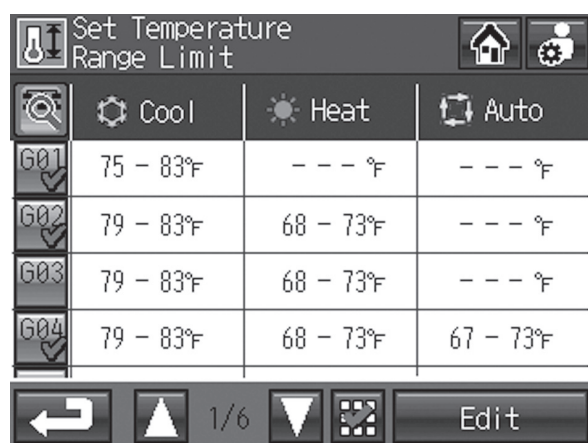
3. SYSTEM CONTROLLER



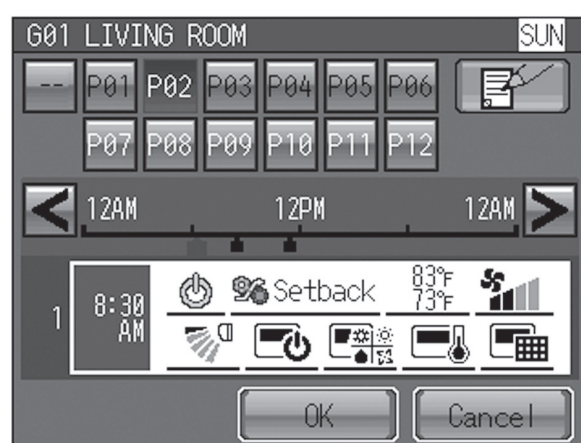
Operation Lock



Prohibit Remote Controller



Set Temperature Range Limit



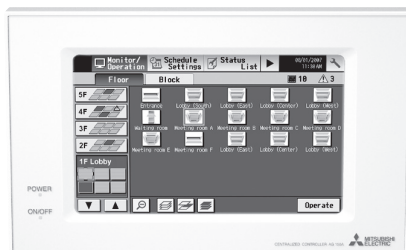
Set Schedule



Display Format

3. SYSTEM CONTROLLER

3-5. Central controller [AG-150]



A. The centralized controller of AG-150 combines Web function (optional), which enable the air conditioner system management on a PC browser screen.

*1The management can even be carried out remotely.

*1 Microsoft® Internet explorer Ver. 6 or later by Microsoft Corporation is needed.

(Note: You must have "Sun Microsystems Java".)

Microsoft® Internet explorer is a registered trade mark of Microsoft Corporation US in the USA and other countries.

Note: Connect AG-150 to a private network.

B. Together with integrated centralized control software TG-2000, tenant billing, scheduling, etc., can be carried out. Details, please refer to the TG-2000 section.

C. One AG-150 can control maximum 50 Indoor units (including LOSSNAY). The integrated centralized control software TG-2000 can manage maximum 40 AG-150s, therefore can manage maximum 2000 Indoor units (including LOSSNAY).

D. Taking advantage of AG-150's Web functions, alarming E-mail containing address and error code can be sent to appointed E-mail address upon any fault happen at the air conditioner system.

E. AG-150 features a 9"-wide color LCD touch panel. The settings for air conditioning units can be changed by touching the corresponding icons on the display.

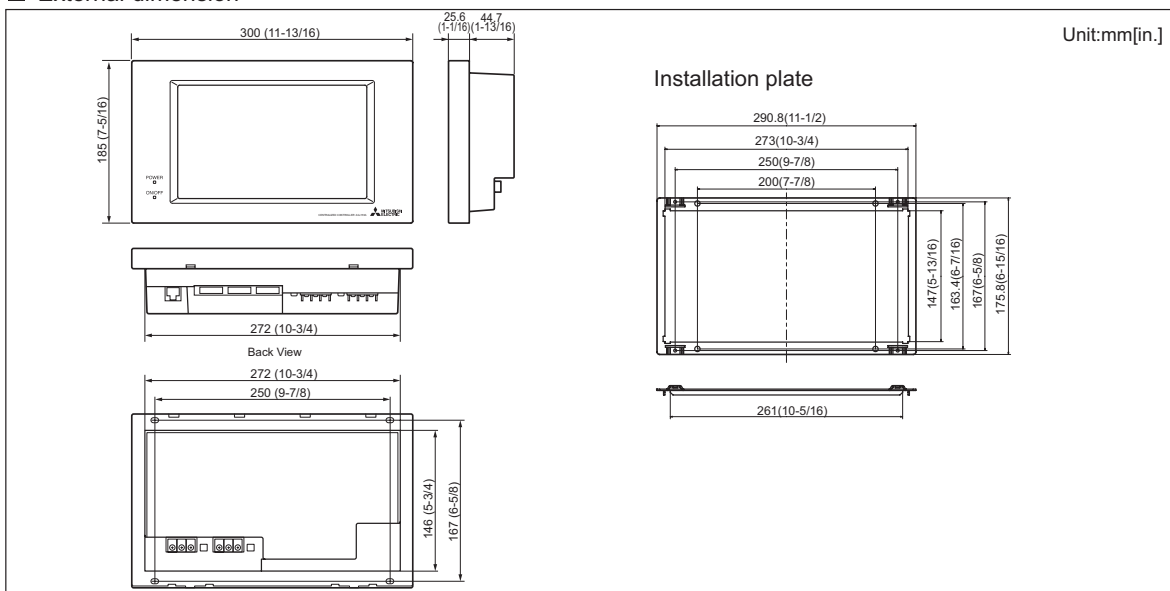
F. The interlock-control option enables interlocked operations of air conditioning unit groups and the general equipment groups, based on the changes of status in the ON/OFF, Mode, or Error signals. (Can be set from the Web browser only)

■ Functions

□: Each unit ○: Each group ●: Each block
△: Each floor ⊙: Collective X: Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	○ ⊙ △ ●	○ ⊙
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. (Group of LOSSNAY unit : automatic ventilation/ vent - heat interchange/ normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is the City Multi R2 and WR2 series only.	○ ⊙ △ ●	○
Temperature setting	Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) () when using middle-temperature on POFY, PEFY-NMSUN/MHJ by setting DipSW7-1 to ON. * Range of temperature settings vary depending on model.	○ ⊙ △ ●	○
Night setback setting	This function helps keep the indoor temperature in the temperature range while the units are stopped and during the time this function is effective.	○	○
Fan speed setting	Models with 5 air flow speed settings: Hi/Mid-2/Mid-1/Low, Auto Models with 4 air flow speed settings: Hi/Mid/Low, Auto Models with 2 air flow speed settings: Hi/Low Fan speed setting (including Auto) varies depending on the model.	○ ⊙ △ ●	○
Air flow direction setting	Air flow direction angles, 4-angle or 5-angle Swing, Auto *1: Louver cannot be set. *Air flow direction settings vary depending on the model.	*1 ○ ⊙ △ ●	○
Schedule operation	Weekly schedule can be set for each group of air conditioning units. *2 By registering a license for AG-150A, weekly (2 types), annual, and current day scheduling function become available. The system follows either the current day, annual schedule, or weekly, which are in the descending order of overriding priority. Twenty-four events can be scheduled per day, including Start/Stop, Mode, Temperature Setting, Operation Prohibition, Vane Direction, and Fan Speed. Two types of weekly schedule (Summer/Winter) can be set. Settable items dependant on the indoor unit model.	*2 ○ ⊙ △ ●	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *3: When the local remote controller inactivation command is received from the master system controller, "Disabled" appears in inverted display on the operation setting screen.	○ ⊙ △ ●	*3 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	X	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed. 4: When an error occurs, the "ON/OFF" LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection.	X	*4 □ ⊙
Test run	This operates air conditioner units in test run mode.	○ ⊙ △ ●	○
Ventilation equipment	The interlocked system settings can be performed by the master system controller. When setting the interlocked system, you can use the ventilation switch to switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	○ ⊙ △ ●	○
External input/output	By using accessory cables you can set and monitor the following. Input: By level signal: "Batch start/stop", "Batch emergency stop" By pulse signal: "Batch start/stop", "Enable/disable local remote controller" Output: "Start/stop", "Error/Normal" *5: Requires the external I/O cable (PAC-YG10HA-E) sold separately.	⊙ *5	⊙ *5

■ External dimension



3-5-1. Power supply to AG-150

AG-150 needs DC power supply of 24~30V (M-NET) and 24V; the former is for centralized control transmission use and the latter is for AG-150's operating and LAN function use. AG-150 can have power-supply at following 1,2 methods.

3-5-1-1. Power supply unit PAC-SC51KUA is the recommended power supply for AG-150A. The basic scheme is as follows.
For details, please refer to Power supply unit PAC-SC51KUA.

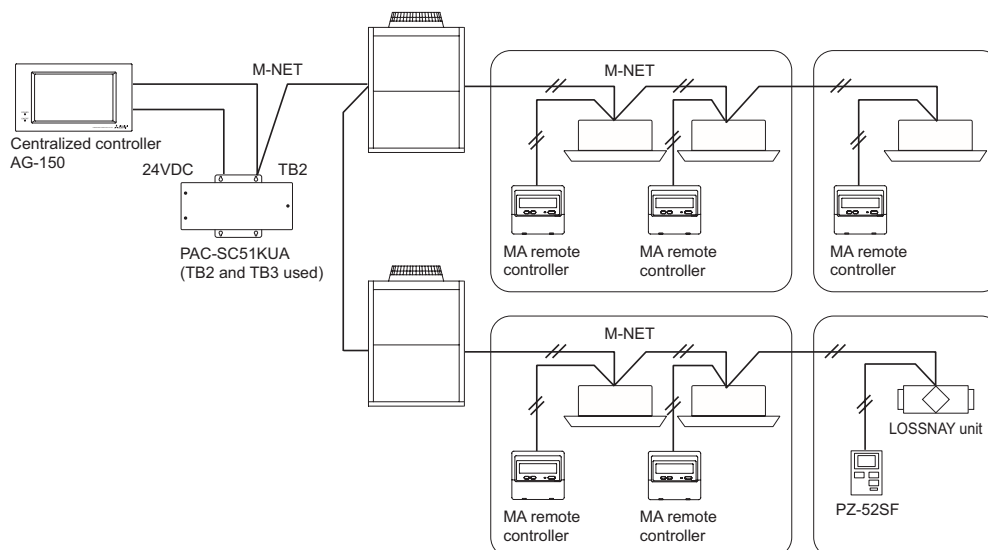


Fig. 3-5-1 AG-150A and PAC-SC51KUA basic scheme.

3-5-1-2. Power supply of 30VDC (M-NET) from connector of TB3 of Outdoor unit and PAC-SC51KUA.

AG-150A can also receive power supply from TB3 connector of the R410A or R407C, R22 Outdoor unit. Yet, Outdoor unit down will lead down to AG-150A too. The kind of connection is possible but not recommended air conditioner system of multiple Outdoor units. The 24VDC can be supplied at TB3 connector of PAC-SC51KUA.

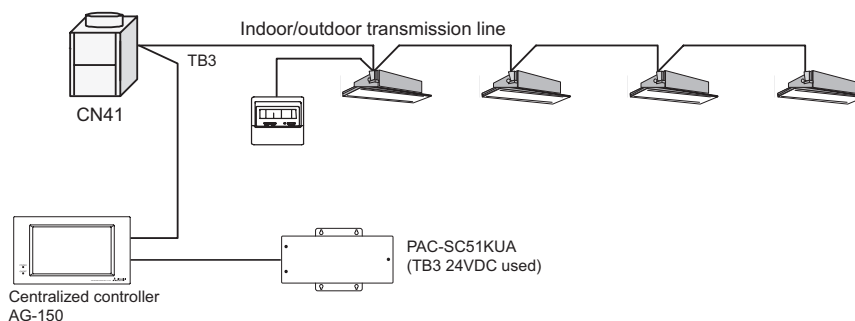


Fig. 3-5-2 AG-150, TB3 and PAC-SC51KUA scheme.

⚠ CAUTION

- When applying Charge and/or Peak-cut function on AG-150A, Power Supply Unit (PAC-SC51KUA) is recommended to use. AG-150A is possible to receive power from the one of the Outdoor units, but there is a risk that the failure of power supply from the Outdoor unit will cause AG-150A's function-down on the whole system.
- At the air conditioner system of multiple Outdoor units, the connector of CN41 is changed to CN40 at only one of the Outdoor units when TB7 is used to supply power. When the Outdoor unit failed, the connector at another unit can be changed from CN41 to CN40 to recover the power supply, but remember to change the CN40 back to CN41 at the failed Outdoor unit.

3. SYSTEM CONTROLLER

3-5-2. External input/output usage

3-5-2-1. External signal input function

※External signal input requires the external I/O adapter (Model: PAC-YG10HA) sold separately.

(1) External input

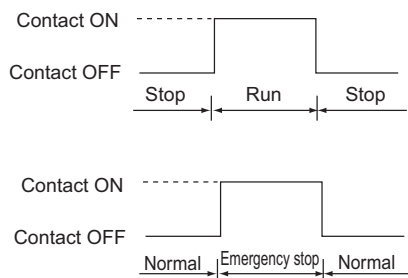
Emergency stop/normal, run/stop and prohibit/permit of local remote controller operation can be controlled for all air conditioners being controlled by using a voltage (12VDC or 24VDC) contact signal from an external source.

(Select with the function select setting.)

No	Function name	External signal input function	Remarks
1	Not in use	Do not use external input signal (factory setting)	
2	Emergency stop (Level signal)	Execute emergency stop/normal with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operation and prohibit/permit change operations will be prohibited during emergency stop. Timer operation will also be prohibited.
3	ON/OFF (Level signal)	Perform ON/OFF with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operations and prohibit/permit change operations will be prohibited. Timer operation will also be prohibited.
4	ON/OFF prohibit/permit (Pulse signal)	Perform ON/OFF, prohibit/permit with pulse signals.	Set the pulse width while the contact is ON to 0.5 to 1 sec.

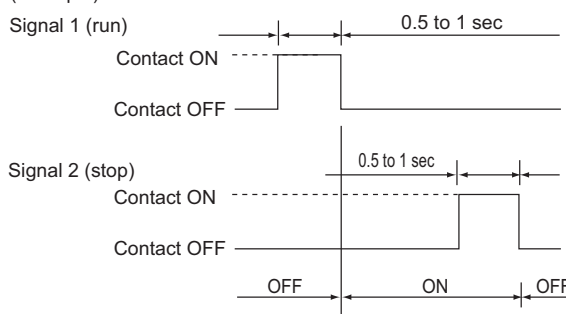
(2) Level signal and pulse signal (12VDC or 24VDC)

(A) Level signal



(B) Pulse signal

(Example) for ON/OFF



*The prohibit/permit input is the same.

(3) External input specifications

CN5	Lead wire	Emergency stop/normal level signal	ON/OFF, level signal	ON/OFF, prohibit/enable pulse signal
No.5	Orange	Emergency stop/normal input	ON/OFF input	ON input
No.6	Yellow	Not used	Not used	OFF input
No.7	Blue	Not used	Not used	Local remote controller operation prohibit input
No.8	Gray	Not used	Not used	Local remote controller operation enable input
No.9	Red	External DC source "+ 12VDC" or "+ 24VDC"		

(A) For level signal

- ① When the emergency stop/normal signal is selected, the status will change from normal to emergency stop when the external input signal contact changes from OFF to ON, and will change from emergency stop to normal when the contact changes from ON to OFF. Air conditioning units that came to an emergency stop will remain stopped after the emergency stop is cancelled. Manually start up each unit to restore the previous operation.
- ② When the ON/OFF signal is selected, the status will change from OFF to ON when the external input signal contact changes from OFF to ON, and will change from ON to OFF when the contact changes from ON to OFF.

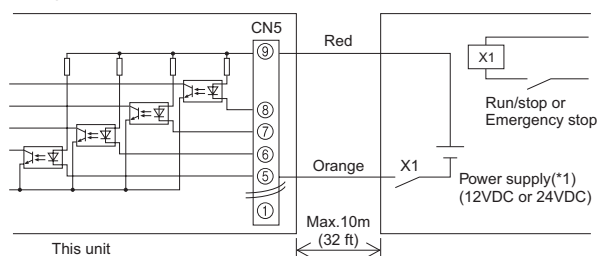
(B) For pulse signal

- ① Even if the ON signal is input during ON, the status will remain ON.
- ② If the local remote controller is prohibited, the ON/OFF operation mode and temperature setting operations by the local remote controller will be prohibited.
- ③ Set the pulse width (contact ON time) to 0.5 to 1 sec.

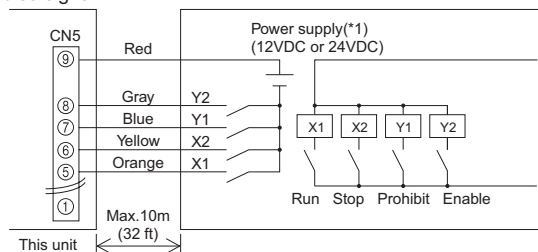
3-5-2-1. External signal input function

(4) Recommended circuit example

(A) For level signal



(B) For pulse signal



Use relays X1, X2, Y1, and Y2 that meet the following specifications.

Contact rating

Rated voltage $\geq 12\text{VDC}$

Rated current $\geq 0.1\text{A}$

Minimum applicable load $\leq 1\text{mA at DC}$

① The contact relay, DC power source, extension cable, etc., must be prepared separately at the site.

② The connection cable can be extended up to 10m (32 ft). (Use a 0.3mm^2 (AWG 22) or larger wire.)

③ Strip the extra cable near the connector, and securely insulate the exposed section with tape, etc.

3-5-2-2. External signal output function

* External signal output requires the external I/O adapter (Model: PAC-YG10HA) sold separately.

(1) External output

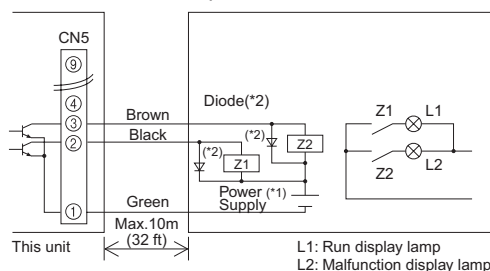
When one or more air conditioners are running, the " ON " signal will be output and if a malfunction occurs in one or more air conditioners, the " Malfunction " signal will be output.

(2) External output specifications

CN5	Lead wire	Details of each terminal
No.1	Green	Common (External ground)
No.2	Black	ON/OFF
No.3	Brown	Malfunction/normal

① The " ON " signal is output even while the " Malfunction " signal is being output.

(3) Recommended circuit example



Use Z1 and Z2 relays that meet the following specifications.

Operation coil

Rated voltage : 12VDC, 24VDC

Power Consumption: 0.9W or less

(*1) Prepare a power supply separately according to the relay being used. (12VDC or 24VDC)

(*2) Always insert a diode on both ends of the relay coil.

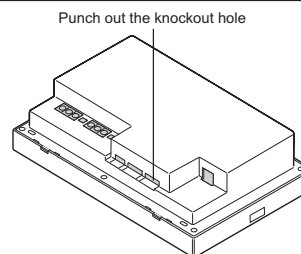
① Each element will turn on while ON operation or a malfunction occurs.

② The connection cable can be extended up to 10m (32 ft).

③ The relays, lamps, diodes and extension cables, etc, must be prepared separately at the site.

NOTE

* When connecting the external input/output cables to connector CN5 on the controller, punch out the knockout hole.

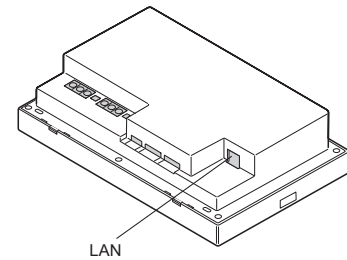


3. SYSTEM CONTROLLER

3-5-3. LAN connection function

When using the LAN connection function, connect the LAN cable to the LAN connector of this device.

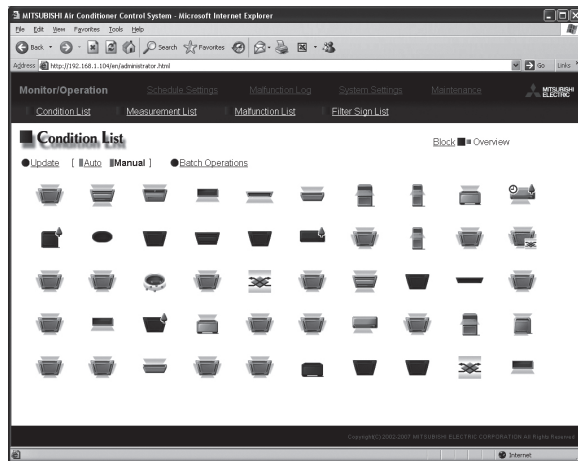
- *Procure the LAN cable at the site, and use 100 BASE-TX Straight cable.
- *For a description of the IP address setting method, refer to Instruction Book.
- *LAN is 100 BASE-TX Specification.



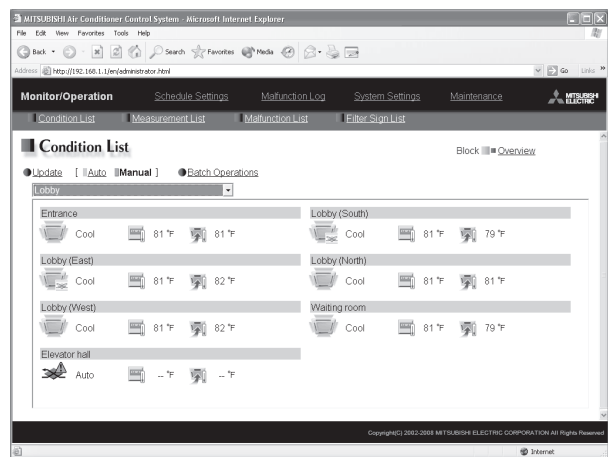
NOTE

- * Perform the LAN wiring before installation, and wire up to the body by the same method as wiring the M-NET transmission line.
- * When a LAN is already connected, decide the IP address by consultation with the system administrator and connect to the LAN body after changing the IP address.
- * Connect AG-150 to a private network.

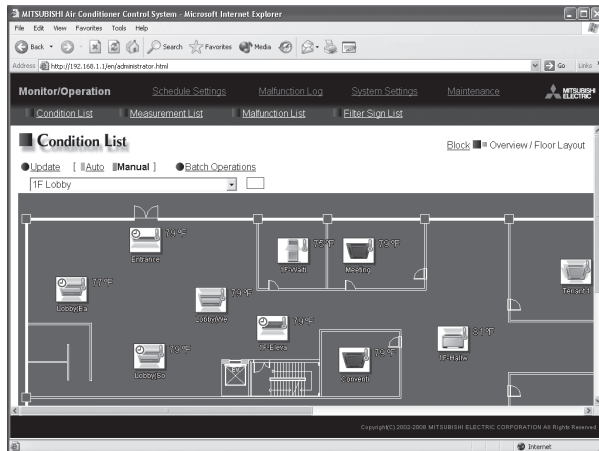
Browser screens of AG-150



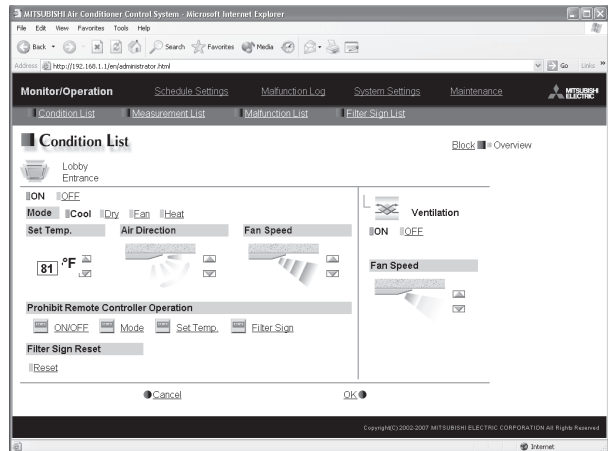
Condition List (Overview)



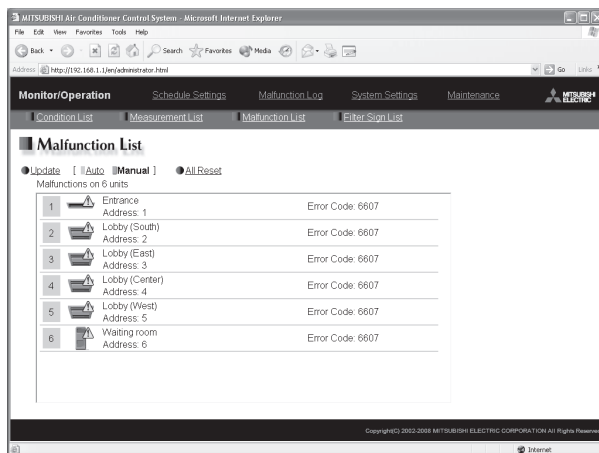
Condition List (Block)



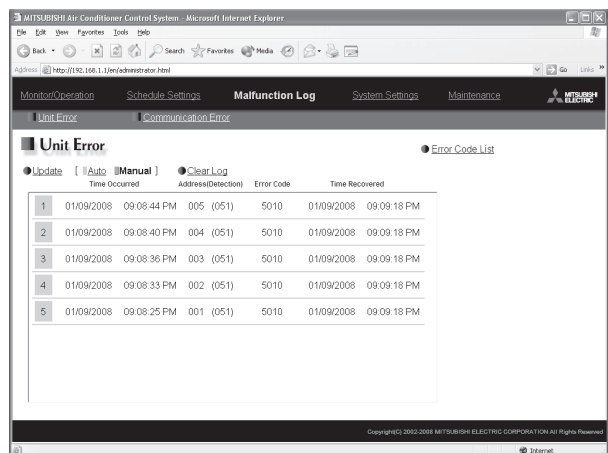
Condition List (Overview/Floor Layout)



Operation

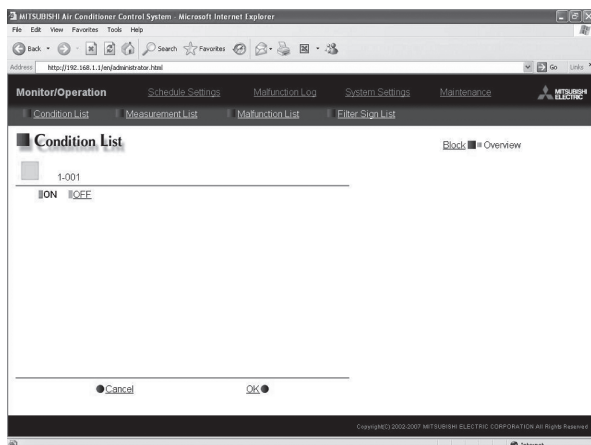


Malfunction List

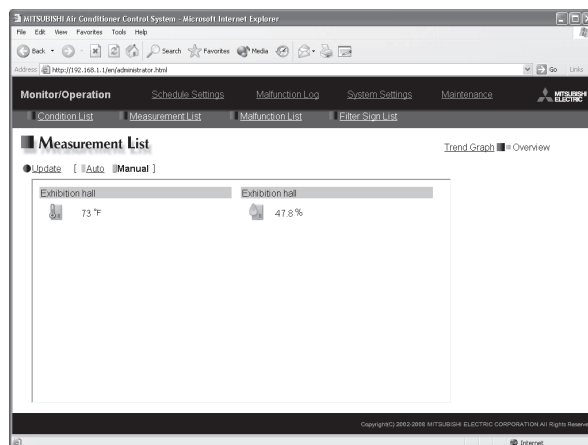


Malfunction Log

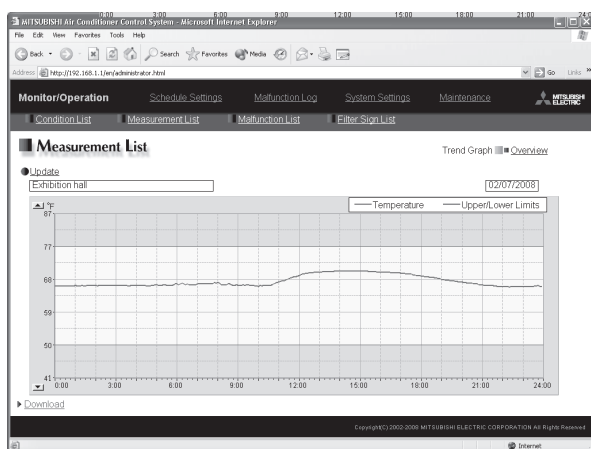
3. SYSTEM CONTROLLER



Operation (DIDO Controller)

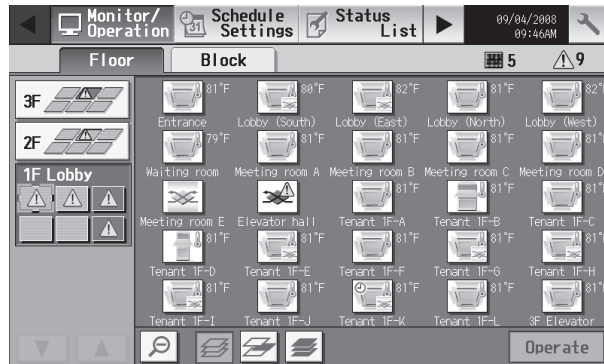


Measurement status monitor (temperature sensor/humidity sensor /measurement meter)

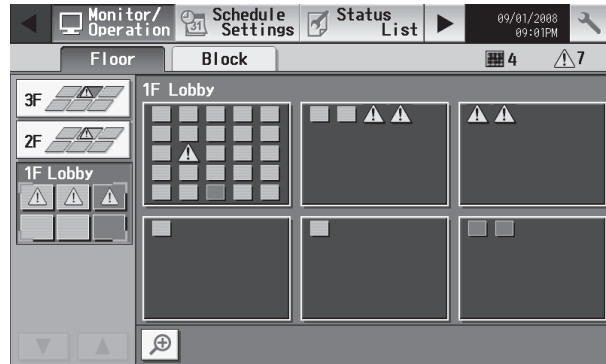


Trend Graph (temperature/humidity)

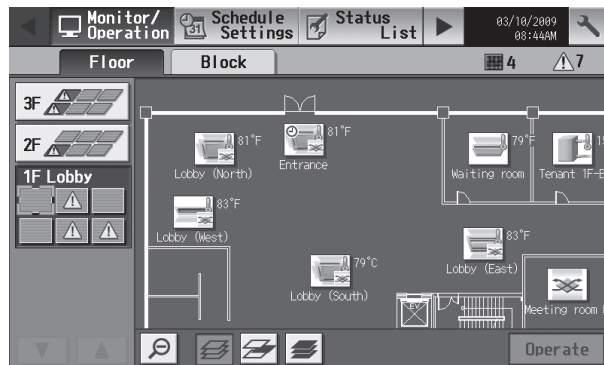
Liquid crystal displays of AG-150



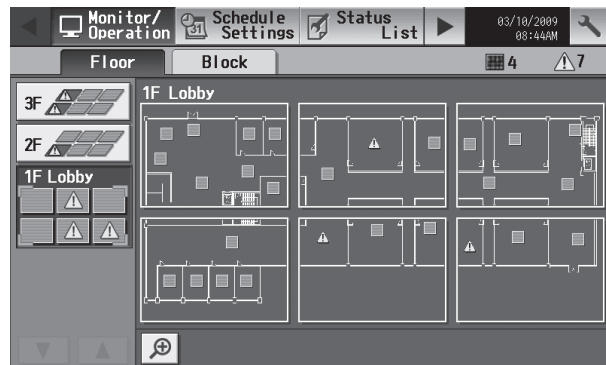
Floor screen



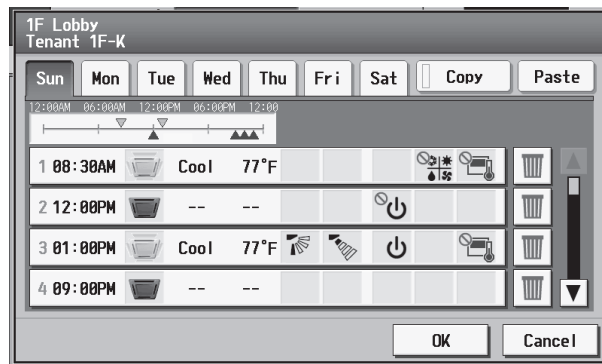
Floor screen (Zoom-out display)



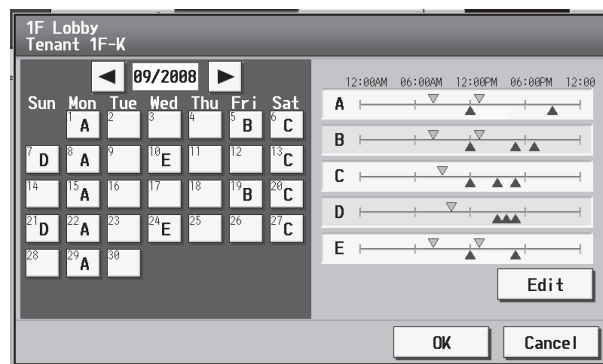
Floor layout screen



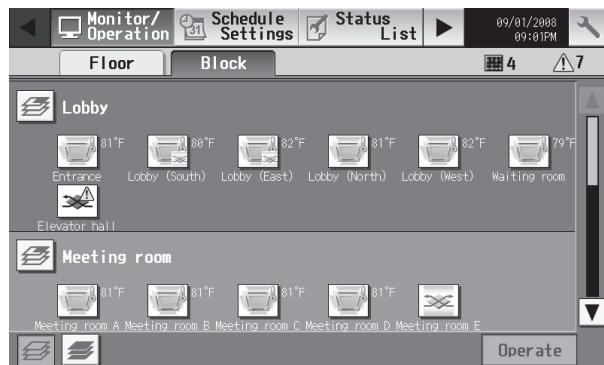
Floor layout screen (Zoom-out display)



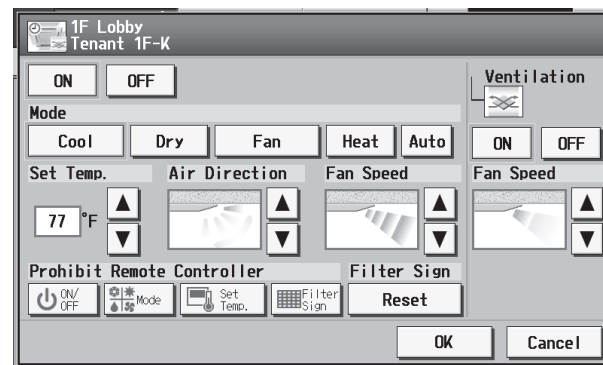
Weekly schedule setting screen



Annual schedule setting screen



Block display screen



Operation screen

3. SYSTEM CONTROLLER

Monitor/Operation			
Schedule Settings			
Status List			
06/07/2008 04:33PM			
Malfunction		Filter Sign	
Group Name		Address	Error Code
1	1F Lobby Lobby (North)	004	5010
2	1F Lobby Lobby (West)	005	5010
3	1F Lobby Waiting room	006	5010
4	1F Lobby Meeting room A	007	5010
5	1F Lobby Meeting room B	008	5010
All Reset			

Error status screen

Schedule Settings			
Status List			
Log			
09/01/2008 09:10PM			
Unit Error		Communication Error	
Time Occurred	Address (Detection)	Error Code	Time Recovered
1 09/01/2008 09:08PM	005 (051)	5010	09/01/2008 09:09PM
2 09/01/2008 09:08PM	004 (051)	5010	09/01/2008 09:09PM
3 09/01/2008 09:08PM	003 (051)	5010	09/01/2008 09:09PM
4 09/01/2008 09:08PM	002 (051)	5010	09/01/2008 09:09PM
5 09/01/2008 09:08PM	001 (051)	5010	09/01/2008 09:09PM
Clear Log			

Error history display screen

3-6. Central controller [GB-50ADA]



- A. The central controller of GB-50ADA combines Web function, which enable the air conditioner system management on a PC browser screen. *1.
The management can even be carried out remotely.

*1 Microsoft® Internet Explorer Ver. 6 or later by Microsoft Corporation is recommended.
(Note: You must have operating system which complies with "Sun Microsystems® Java Plug-in". When using Internet Explorer (64 bit), use Java Plug-in (64bit).)
Microsoft® Internet explorer is a registered trade mark of Microsoft Corporation US in the USA and other countries.
Sun Microsystems® and Java are trademarks or registered trademarks of Sun Microsystems Inc. in the United States and/or other countries.

Note: Connect GB-50ADA to a private network. Use a security device such as a VPN router when connecting the GB-50ADA to Internet to prevent unauthorized access.

- B. One GB-50ADA can control maximum 50 Indoor units(including LOSSNAY). The integrated centralized control software TG-2000 (*2) can manage maximum 40 GB-50ADAs and maximum of 2000 units (including LOSSNAY).
*2 TG-2000 Ver.6.30 or later is required to control GB-50ADA.

- C. GB-50ADA has a built-in function to supply power to the M-NET transmission line. (power supply coefficient: 6)

- D. Taking advantage of GB-50ADA's Web functions, alarming E-mail containing address and error code can be sent to appointed E-mail address upon any fault happen at the air conditioner system. This could release standby personnel and save operation cost.

- E. Together with integrated centralized control software TG-2000, and/or other controller (DIDO, AI controller), optional functions like tenant billing can be performed.

- F. The following licenses are pre-registered.
"Web Monitor", "Annual Schedule, Weekly Schedule", "Sending Error Mail", "Maintenance Tool Advanced" and "Interlock Control"

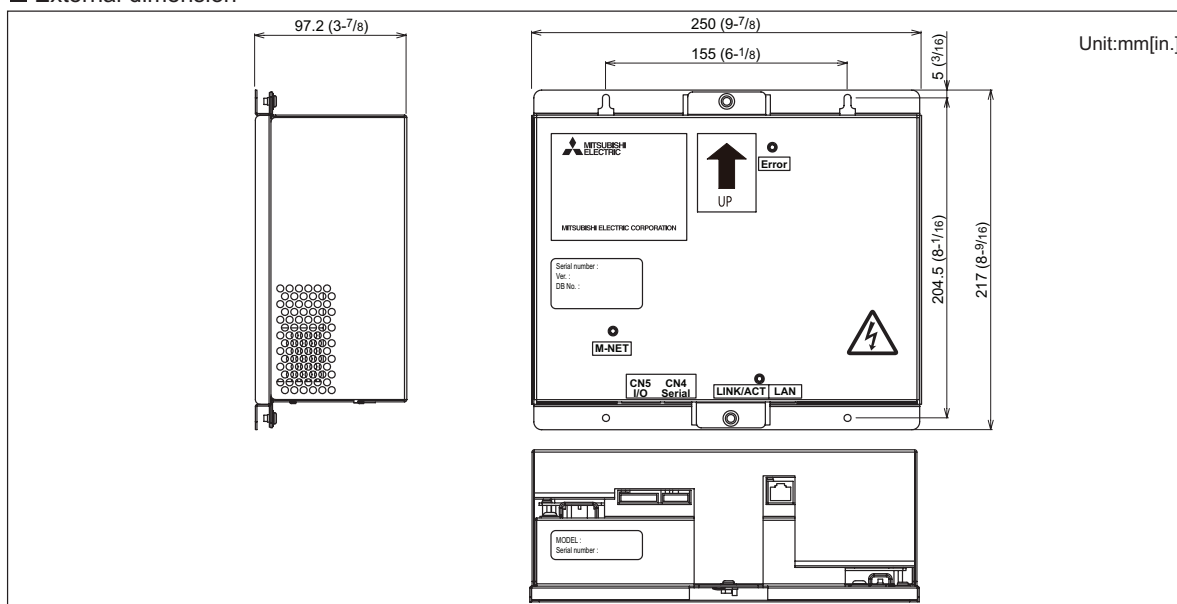
Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	○ ● ◎	○ ◎
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. (Group of LOSSNAY unit: automatic ventilation/vent - heat interchange/ normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is only for City Multi R2 and WR2 series.	○ ● ◎	○
Fan speed setting	Models with 5 air flow speed settings: Hi/Mid-2/Mid-1/Low, Auto Models with 4 air flow speed settings: Hi/Mid/Low, Auto Models with 2 air flow speed settings: Hi/Low *Fan speed settings vary depending on the model.	○ ● ◎	○
Air flow direction setting	Air flow direction angles, 4-angle or 5-angle Swing, Auto *1: Louver cannot be set. *Air flow direction settings vary depending on the model.	○ ● ◎	○
Ventilation equipment	The interlocked system settings can be performed by the master system controller. When setting the interlocked system, you can use the ventilation switch to switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	○	○
Temperature setting	Range of temperature setting Cool/Dry: 19°C - 30°C (14°C - 30°C) / 67°F - 87°F (57°F - 87°F) Heat : 17°C - 28°C (17°C - 28°C) / 63°F - 83°F (63°F - 83°F) Auto : 19°C - 28°C (17°C - 28°C) / 67°F - 83°F (63°F - 83°F) () in case of using middle-temperature on PEFY, PEFY-VML/VMR/VMS /VMH-by setting DipSW7-1 to ON. Yet, PEFY-P-VMH-E-F is excluded. * Range of temperature settings vary depending on model.	○ ● ◎	○
Sliding Temperature setting	This function shifts the preset temperature by the preset increment to reduce the temperature difference between the indoor and outdoor air temperatures during cooling operation. The maximum shifting temperature(+1°C, +2°C, +3°C, +4°C) can be set for each group.	○	○
Schedule operation	Annual/Weekly (2 types)/today schedule can be set for each group of air conditioning units. Optimized startup setting is also available. *2: The system follows either the current day, annual schedule, or weekly, which are in the descending order of overriding priority. Twenty-four events can be scheduled per day, including ON/OFF, Mode, Temperature Setting, Operation Prohibition, Vane Direction, and Fan Speed. Two types of weekly schedule(Summer/Winter) can be set. Settable items depend on the functions that a given air conditioning unit supports.	○ ● ◎	○
Night setback setting	The function keeps the indoor temperature in a set temperature range once the unit stops and during the time this function is effective.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *3: When the local remote controller inactivation command is received from the master system controller, "Disabled" appears in inverted display on the operation setting screen.	○ ● ◎	○ ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	×	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed. *4: The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection.	×	*4 □
Interlock setting	Operation of indoor groups or general equipment can be interlocked by the change of state (ON/OFF, mode, error of indoor groups and general equipment). (GB-50ADA will execute interlocking control depending on the interlocked setting.)	○	○
Test run	This operates air conditioner units in test run mode.	○ ◎ △ ●	○
External input/output	By using accessory cables you can set the following. Input: By level signal: "Batch start/stop", "Batch emergency stop" By pulse signal: "Batch start/stop", "Enable/disable local remote controller" *5: Requires the external I/O cable (PAC-YG10HA) sold separately and external power supply. By using accessory cables you can monitor the following. Output: "Start/stop", "Error/Normal" *5: Requires the external I/O cable (PAC-YG10HA) sold separately and external power supply.	*5 ◎ ×	×
M-NET	The "M-NET" LED lights, when M-NET power supply is turned ON. The LED blinks during M-NET communication.	×	◎ (LED)
Collective ON/OFF	All units can operate / stop with a DIP switch.	◎	◎ (7 SEG)
Data back-up (USB memory)	The initial setting data, operation data (charge parameter, power consumption data (*6)) can be stored to a USB memory. Initial setting data can be read from USB memory. *6: GB-50ADA Ver.2.45 or later	◎	—

Note: GB-50ADA can control up to 50 units. GB-50ADA is not connectable with PAC-YG50ECA.

External dimension



3. SYSTEM CONTROLLER

1. M-NET power supply

GB-50ADA has a built-in function to supply power to the M-NET transmission line. (power supply coefficient: 6)
When power is supplied from GB-50ADA, the types of system controllers listed in the table below are connectable.

	System controller		M-NET remote controller
	ON/OFF remote controller	System remote controller Schedule timer Group remote controller	ME remote controller LOSSNAY remote controller
Power consumption coefficient	1	0.5	0.25
Connectable units	6 units	12 units	24 units

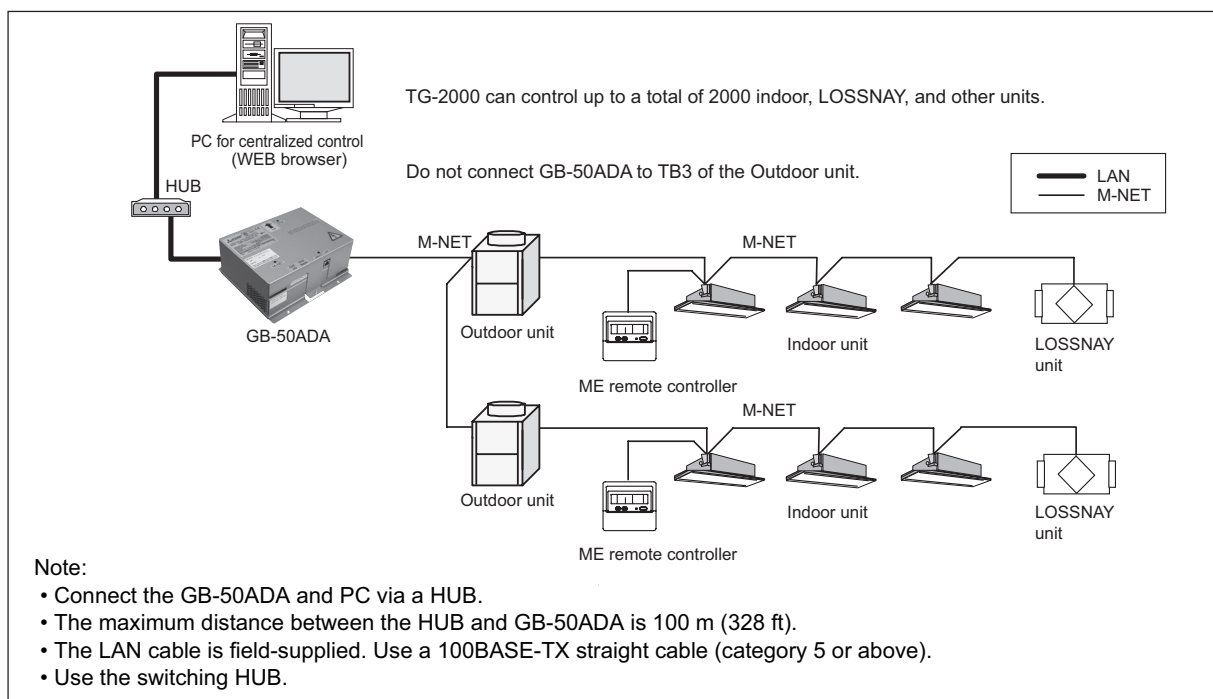
V:connectable

	Total number of ON/OFF remote controllers							
	0	1	2	3	4	5	6	
Total number of system remote controllers, schedule timers, and group remote controllers combined.	0	V	V	V	V	V	V	V
	1	V	V	V	V	V	V	
	2	V	V	V	V	V	V	
	3	V	V	V	V	V		
	4	V	V	V	V	V		
	5	V	V	V	V			
	6	V	V	V	V			
	7	V	V	V				
	8	V	V	V				
	9	V	V					
	10	V	V					
	11	V						
	12	V						

V:connectable

- Note**
- AG-150 and GB-50ADA cannot be used in the same M-NET system.
 - Supplying power from the Outdoor unit or the power supply unit, it is necessary to replace power supply switch connector CN40 with CN41.(Factory default is CN40.)
 - **When connecting both GB-50ADA and BAC-HD150 (BM ADAPTER) to the same M-NET system, certain restrictions apply. Consult your dealer for details.**

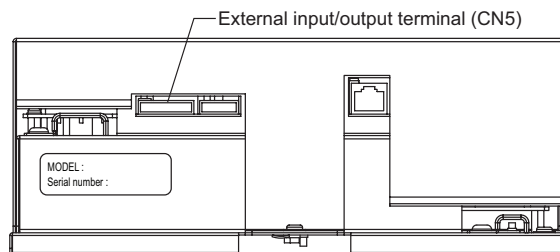
2. System configuration



3. External input/output usage

(1). External signal input function

* To use the external signal input, a separately-sold external input/output adapter (PAC-YG10HA) and external power supply are required.



1). External input signal function setting (to be set from the web browser for Initial settings)

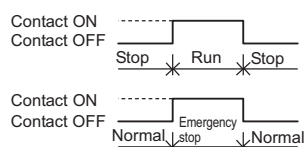
External contact signal (12VDC or 24VDC) can be used to send signals indicating the following status of all air conditioning units that are controlled by the controller: Emergency stop/Normal, Run/Stop, and local remote controller operation Prohibit/Permit.

No.	External input signal function	Notes
1	External input signal will not be used. (factory setting)	—
2	Emergency stop/Normal (level signal)	During the emergency stop, the Run/Stop mode cannot be changed from the local remote controller, and the Run/Stop mode and Prohibit/Permit settings cannot be changed from the GB-50ADA. Timer setting will be ignored.
3	Run/Stop (level signal)	The Run/Stop mode cannot be changed from the local remote controller, and the Run/Stop mode and Prohibit/Permit settings cannot be changed from the GB-50ADA. Timer setting will be ignored.
4	Run/Stop, Prohibit/Permit (pulse signal)	The pulse width (contact ON) should be between 0.5 and 1 second.

* DIDO controller (PAC-YG66DCA) cannot be collectively run or stopped by using the external input function. But when [Emergency stop (Level signal)] is selected, DIDO controller (PAC-YG66DCA) can be collectively stopped by setting the appropriate switches on the DIDO controller.

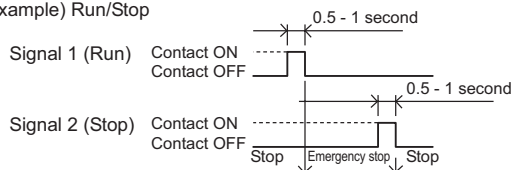
2). Level signals and pulse signals

(A) Level signals



(B) Pulse signal

(Example) Run/Stop



* Same with the Prohibit/Permit signal input.

3). External input specifications

CN5	Lead wire (PAC-YG10HA)	Emergency stop/Normal (level signal)	Run/Stop (level signal)	Run/Stop, Prohibit/Permit (pulse signal)
No. 5	Orange	Emergency stop/Normal signal input	Run/Stop signal input	Operation signal input
No. 6	Yellow	Not used	Not used	Stop signal input
No. 7	Blue	Not used	Not used	Local remote controller operation prohibit signal input
No. 8	Gray	Not used	Not used	Local remote controller operation permit signal input
No. 9	Red	External power supply 12VDC or 24VDC		

(A) Level signals

- If "Emergency stop/Normal operation signal" is selected, the unit will come to an emergency stop when the contact turns on, and the unit will resume normal operation when the contact turns off. When emergency stop is reset, all units will remain stopped, including the ones that were operating before the emergency stop signal input was received. To return to the previous operation status, these units need to be manually restarted.
- If "Run/Stop signal input" is selected, the unit will go into operation when external input signal contact turns ON, and the unit will stop when the contact signal turns OFF.

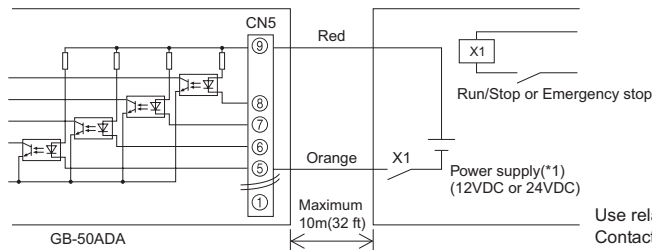
3. SYSTEM CONTROLLER

(B) Pulse signals

- ① If pulse signals to operate the units are received while the units are in operation, the units will continue their operation (same with the Stop, Prohibit, and Permit signals).
- ② When operation from the local remote controllers is prohibited, Run/Stop mode, operation mode, temperature setting, and filter reset settings cannot be changed from the local remote controller.
- ③ The pulse width (contact ON) should be between 0.5 and 1 second.

4). Recommended circuit

(A) Level signals



Use relays that meet the following specifications for X1, X2, Y1, and Y2.

Contact rating

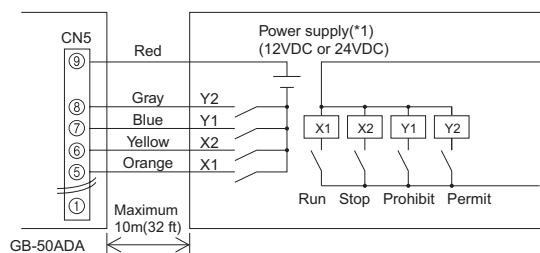
Rated voltage: 12VDC or above

Rated current: 0.1 A or above

Minimum applied load: DC 1 mA or below

(*1) Use a power supply suitable for the type of relays used.
(12VDC or 24VDC)

(B) Pulse signals



① Relays, DC power supplies, and extension cables are field supplied.

② The maximum length of extension cable is 10 m (32 ft). (Use a cable with a diameter of at least 0.3 mm².)

③ Cut the excess cable near the connector, and insulate the exposed cable end with tape.

(2). External signal output function

* A separately sold external input/output adapter (PAC-YG10HA) and external power supply are required to use the external signal output.

1). External output

Operation signal is output when one or more units are in operation, and error signal is output when one or more units are in error.

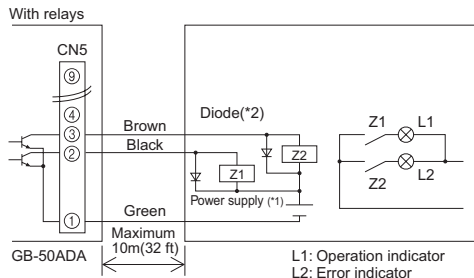
2). External output specification

CN5	Lead wire (PAC-YG10HA)	Terminal type
No. 1	Green	Common GND for external output (external DC, power supply GND)
No. 2	Black	Run/Stop*
No. 3	Brown	Error/Normal

* The operation status of DIDO controller is not output.

* Operation signal is output during an error.

3). Recommended circuit



Use relays that meet the following specifications for Z1 and Z2.

Operation coil

Rated voltage: 12VDC or 24VDC

Power consumption: 0.9 W or less

(*1) Use a power supply suitable for the type of relays used.
(12VDC or 24VDC)

(*2) Use a diode at both ends of the relay coils.

① Each element turns on during operation and error.

② The maximum length of extension cable is 10 m (32 ft).

③ Relays, lamps, diodes, and extension cables are field supplied.

4. LAN connection function

Connect the LAN cable to the LAN connector of this device.

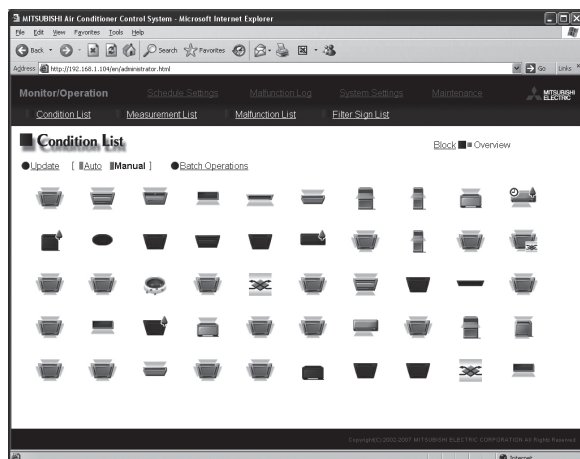
- * Procure the LAN cable at the site, and use an enhanced category 5 UTP cable.
- * For a description of the IP address setting method, refer to Installation Manual.
- * LAN is 100 BASE-TX Specification.
- * The maximum wiring length from HUB to GB-50ADA is 100m [328ft].
- * GB-50ADA is connected to the monitoring PC via HUB.

NOTE

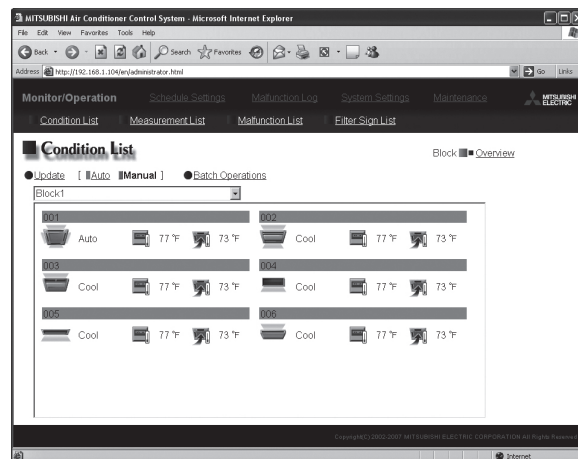
- * Perform the LAN wiring before installation, and wire up to the body by the same method as wiring the M-NET transmission line.
 - * When a LAN is already connected, decide the IP address by consultation with the system administrator and connect to the LAN body after changing the IP address.
 - * Space for the connector and wiring is required. Refer to Installation Manual.
 - * Connect GB-50ADA to a private network.
- Use a security device such as a VPN router when connecting the GB-50ADA to the Internet to prevent unauthorized access.**
(If no security devices are installed, the operation settings may be changed by an unauthorized person without the knowledge of the user.)

3. SYSTEM CONTROLLER

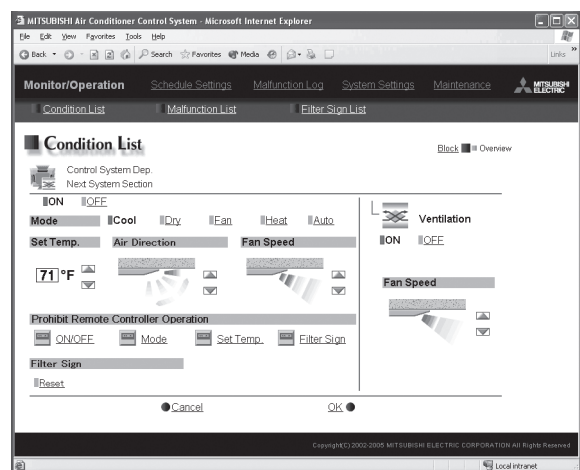
5. Browser screens of GB-50ADA



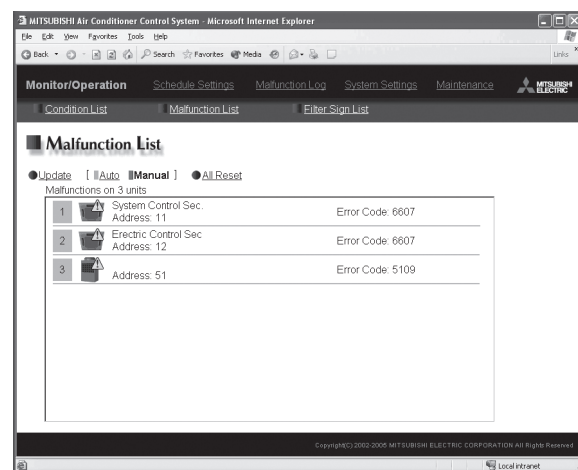
Condition List (Overview)



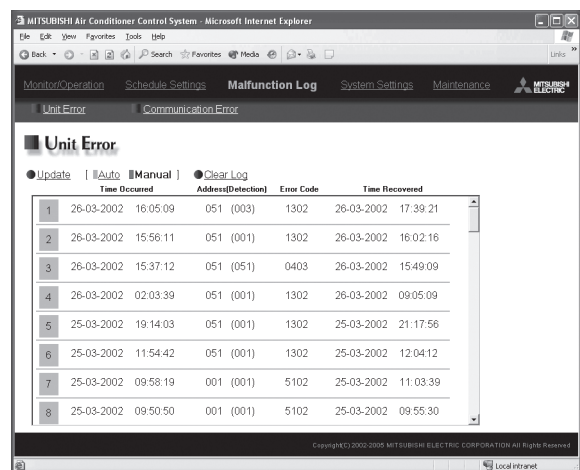
Condition List (Block)



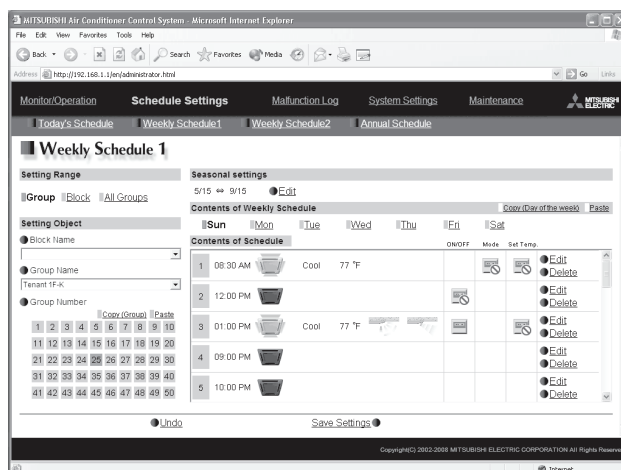
Operation



Malfunction List

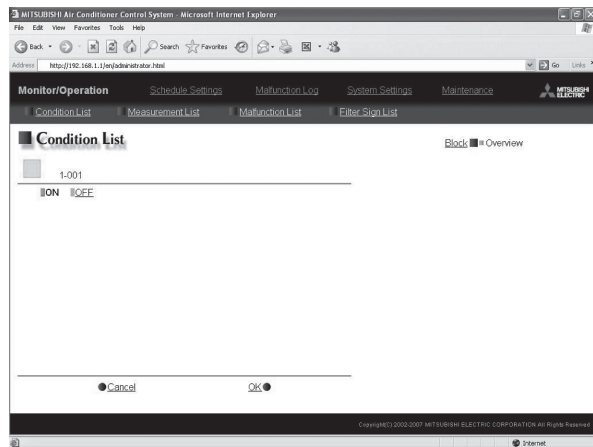


Malfunction Log

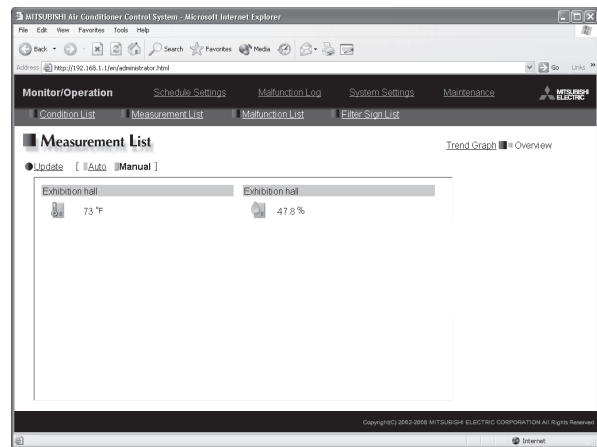


Weekly 1 Schedule

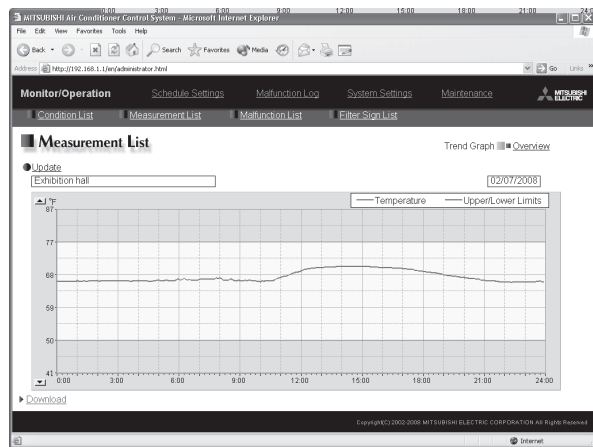
3. SYSTEM CONTROLLER



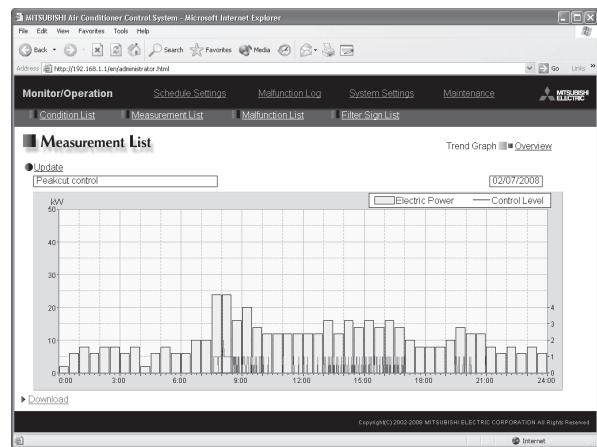
Operation (DIDO Controller)



Measurement status monitor (temperature sensor/humidity sensor /measurement meter)



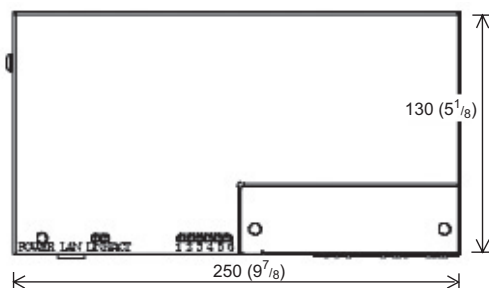
Trend Graph (temperature/humidity)



Trend Graph (Peak cut control)

3. SYSTEM CONTROLLER

3-7. Central controller [GB-24]



■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for the air conditioning units	○ ◎ ●	○ ◎
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat / Setback. (Group of LOSSNAY unit : automatic ventilation/ vent - heat interchange/ normal ventilation) *Operation modes vary depending on the air conditioner unit.	○ ◎ ●	○
Temperature setting	Range of temperature setting Cool/Dry : 19°C - 30°C (14°C - 30°C) / 67°F - 87°F (57°F - 87°F) Heat : 17°C - 28°C (17°C - 28°C) / 63°F - 83°F (63°F - 83°F) Auto : 19°C - 28°C (17°C - 28°C) / 67°F - 83°F (63°F - 83°F) Setback : Upper limit : 21°C - 30°C (21°C - 30°C) / 69°F - 87°F (69°F - 87°F) Lower limit : 17°C - 26°C (17°C - 26°C) / 63°F - 79°F (63°F - 79°F) (1) In case of using middle-temperature on POFY, PEFY by setting DipSW7-1 to ON. *Range of temperature settings vary depending on indoor unit model.	○ ◎ ●	○
Fan speed setting	Models with 5 air flow speed settings: Hi/Mid-2/Mid-1/Low, Auto Models with 4 air flow speed settings: Hi/Mid/Low, Auto Models with 2 air flow speed settings: Hi/Low *Fan speed settings vary depending on the model.	○ ◎ ●	○
Air flow direction setting	Air flow direction 4-angle or 5-angle, Swing, Auto *1: Louver cannot be set. *Air flow direction settings vary depending on the model.	*1 ○ ◎ ●	○
Schedule operation	Today / weekly / annual schedule can be set in groups from the units. Schedule will be prioritized and performed in orders of Today → annual → weekly. Schedules (ON/OFF, mode, set temp, permit/prohibit) can be changed up to 12 times per day. *2: Schedule operation setting vary depending on the model.	*2 ○ ◎	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (ON/OFF, Operation mode switching, Temperature setting, Reset filter). *3: When the local remote controller inactivation command is received from the main system controller, "Disabled" appears in inverted display on the operation setting screen.	○ ◎ ●	*3 ○
Hold	Prohibits the scheduled operation from being executed.	○ ◎ ●	○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is in operation.	×	○
Error	When an error is currently occurring on an air conditioning unit, the afflicted unit and the error code are displayed. *4: When an error occurs, the "Error" LED flashes. The operation monitor screen shows the abnormal unit by flashing. The error monitor screen shows the abnormal unit's address, error code and source of detection. The error log monitor screen shows the time, date, abnormal unit's address, error code and source of detection.	×	*4 □ ◎
Test run	This operates air conditioning units in test run mode.	×	×
Ventilation equipment	The interlocked system settings can be performed by the master system controller. When setting the interlocked system, you can use the ventilation switch to switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	○	○
External input/output	By using accessory cables you can set and monitor the following. Input: By level signal: "Batch start/stop", "Batch emergency stop" By pulse signal: "Batch start/stop", "Enable/disable local remote controller" Output: "Start/stop", "Error/Normal" *5: Requires the external I/O cable (PAC-YG11HA) sold separately.	*5 ◎	*5 ◎

A. The centralized controller GB-24 combines Web function, which enable the air conditioner system management through a PC browser screen.

*1 The management can even be carried out remotely.

*1 Microsoft® Internet explorer Ver. 6 or later by Microsoft Corporation is needed. (Note: You must have "Sun Microsystems Java"; plug-in Ver.1.4.2 or later). Microsoft is a registered trademark of Microsoft Corporation in the United States and other countries.

Note: Connect GB-24 to a private network.

B. One GB-24 can control maximum of 24 units (including indoor units/LOSSNAY/DIDO²/AI/PI controller).

*2 The maximum number of the controllable units varies depending on the indoor unit or DIDO controller (the number of contacts used).

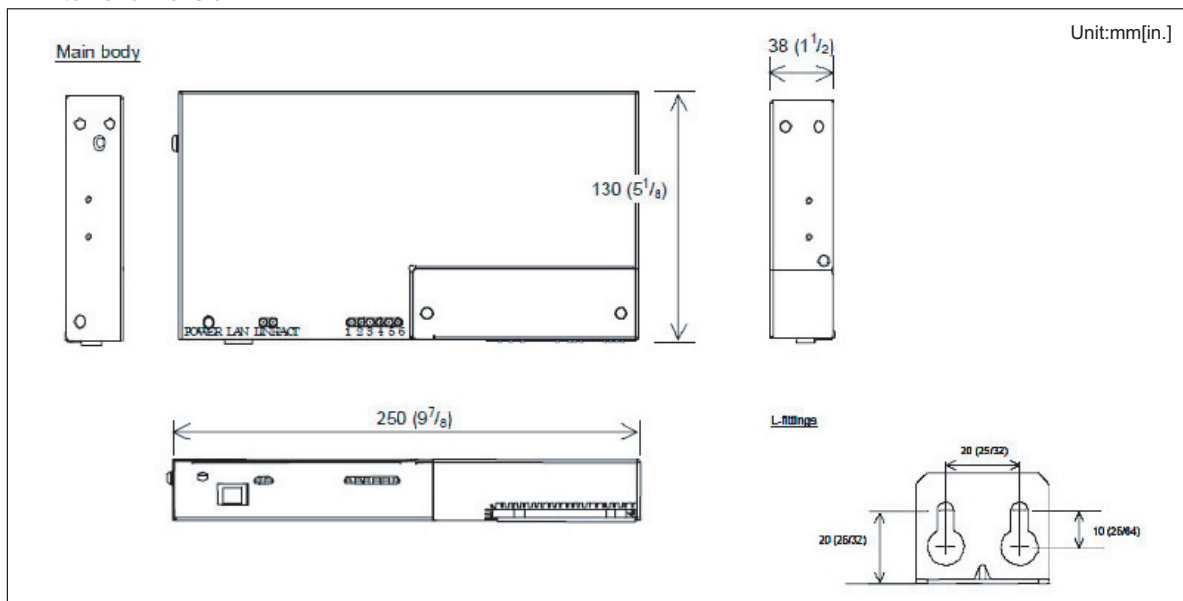
C. Using GB-24's web functions, an error notification email containing the address and error code can be sent to the appointed email address if any problem occurs in the air conditioning system.

D. Set back mode enables the indoor temperature to be controlled within the setting range (○ °C/°F ~ △ °C/°F).

E. Hold operation is a priority function and when it is effective, local remote controller operation (ON/OFF, Mode, set temp) and schedule setting will be prohibited.

Hold operation will maintain even after electric power failure. Use the Automatic restoration after power failure function on the air conditioning units.

■ External dimension



3-7-1. Power supply to GB-24

GB-24 needs DC power supply of M-NET (24~32VDC) for centralized control transmission use, operation and LAN function use.

(1). Power supply of M-NET from power supply unit PAC-SC51KUA.

Power supply unit PAC-SC51KUA is recommended for GB-24. See the diagram below ; for details, please refer to the IM of Power supply unit PAC-SC51KUA

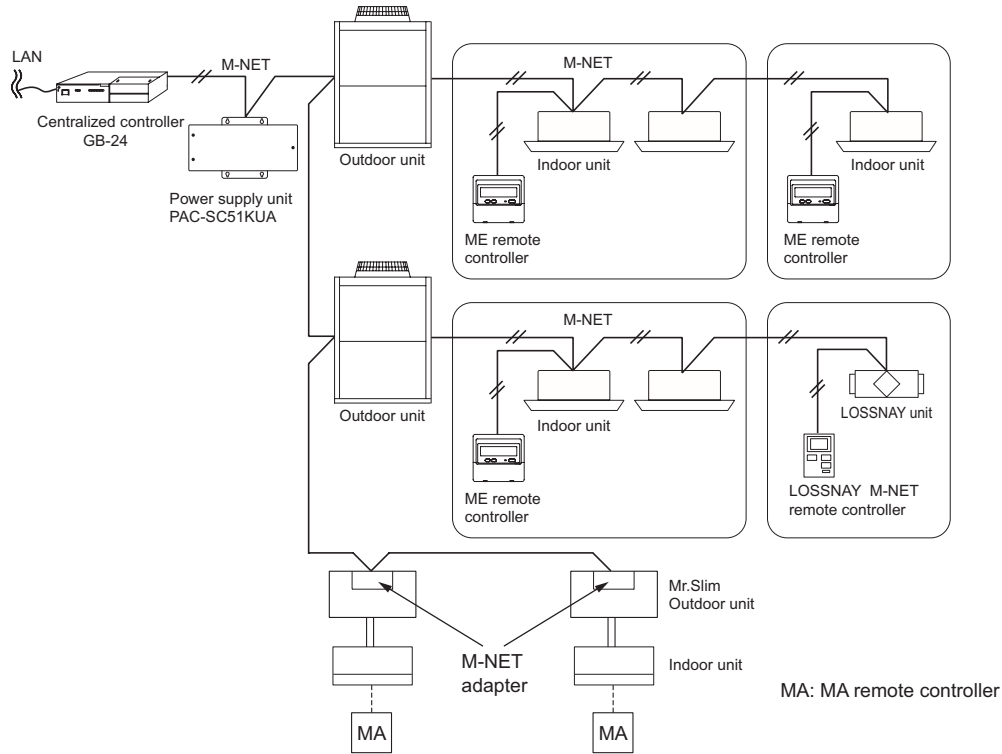


Fig. 1 Basic structure of GB-24 and PAC-SC51KUA

(2). Power supply of M-NET from outdoor unit connector TB7.

As shown on Fig. 2, GB-24 receives power supply of M-NET from R410A outdoor unit connector TB7.

In case one of the outdoor units should change its power supply, switch CN41 to CN40.

*NOTE: This method applies to R410A CITY MULTI outdoor unit except PUMY (S series)

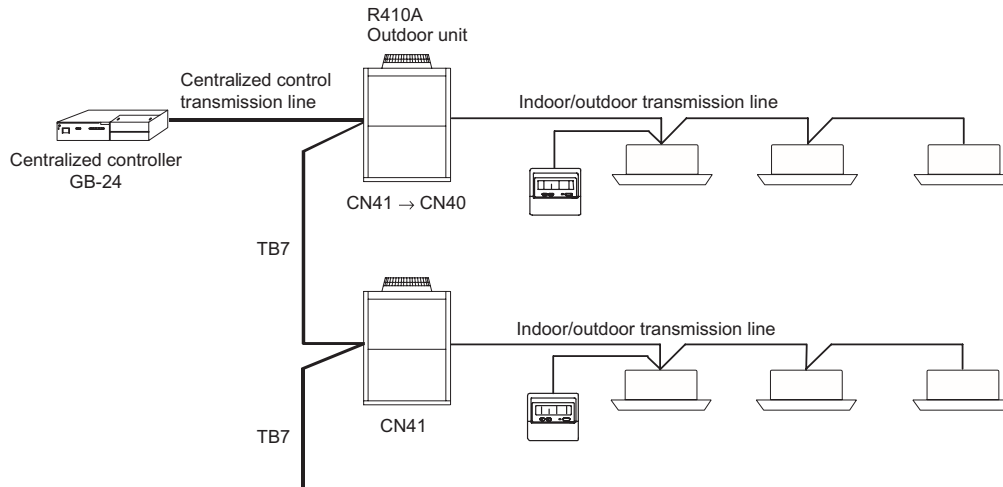


Fig. 2 GB-24, TB7 scheme

3. SYSTEM CONTROLLER

(3) Power supply of M-NET from outdoor unit connector TB3.

GB-24 can also receive power supply from R410A/R407C/R22 outdoor unit connector TB3. However, if the outdoor unit shuts down, GB-24 will also automatically shut down. Therefore, this scheme is not recommended for air conditioning system consisting of multiple outdoor units.

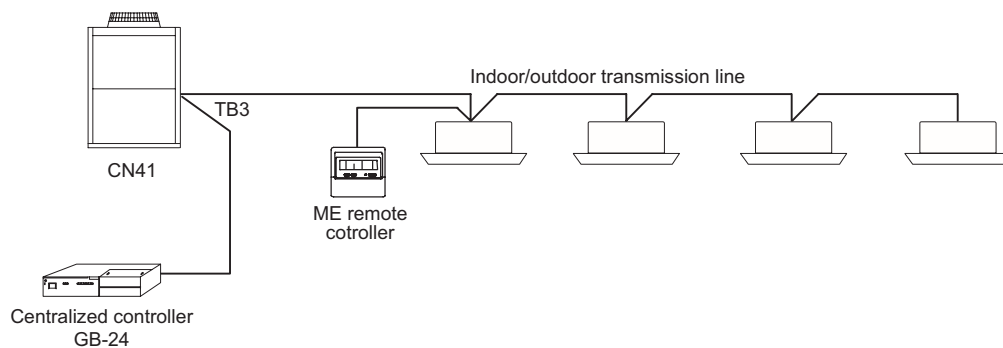
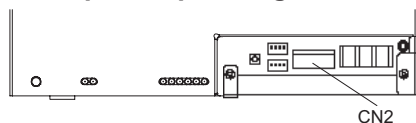


Fig. 3 GB-24, TB3 scheme.

3-7-2. External input/output usage



(1). External signal input function

※ External signal input requires the external I/O adapter (Model: PAC-YG10HA) sold separately.

1). External input

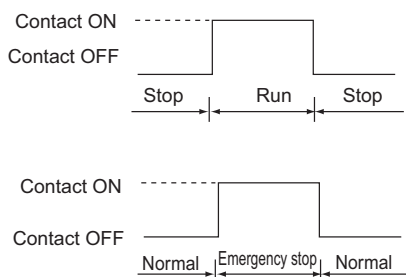
Emergency stop/normal, run/stop and prohibit/enable of local remote controller operation can be controlled for all air conditioners being controlled by using a voltage (12VDC or 24VDC) contact signal from an external source.

(Select the function on the Initial Setting Web or the Initial Setting Tool)

No	External signal input function	Remarks
1	Do not use external input signal (factory setting)	
2	Execute emergency stop/normal with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operation and prohibit/enable change operations will be prohibited during emergency stop.
3	Perform ON/OFF with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operations and prohibit/enable change operations will be prohibited.
4	Perform ON/OFF, prohibit/enable with pulse signals.	Set the pulse width while the contact is ON to 0.5 to 1 sec.

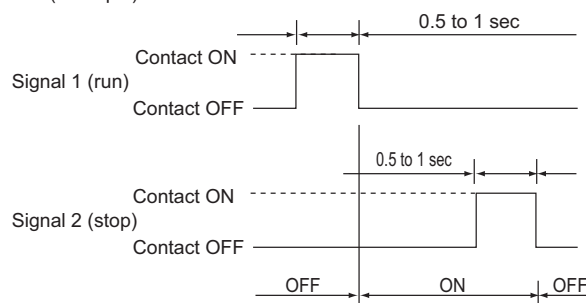
2). Level signal and pulse signal (12VDC or 24VDC)

(A) Level signal



(B) Pulse signal

(Example) for ON/OFF



※ The prohibit/enable input is the same.

3). External input specifications

CN2	Lead wire	Emergency stop/normal level signal	ON/OFF, level signal	ON/OFF, prohibit/enable pulse signal
No.5	Orange	Emergency stop/normal input	ON/OFF input	ON input
No.6	Yellow	Not used	Not used	OFF input
No.7	Blue	Not used	Not used	Local remote controller operation prohibit input
No.8	Gray	Not used	Not used	Local remote controller operation enable input
No.9	Red	External DC source “+”		

(A) For level signal

- ① When the emergency stop/normal signal is selected, the status will change from normal to emergency stop when the external input signal contact changes from OFF to ON, and will change from emergency stop to normal when the contact changes from ON to OFF. Emergency stop signal will bring the air conditioners to stop, and canceling the emergency stop will not automatically reset these units. To go back to the previous operation status, they must be manually turned back on.
- ② When the ON/OFF signal is selected, the status will change from OFF to ON when the external input signal contact changes from OFF to ON, and will change from ON to OFF when the contact changes from ON to OFF.

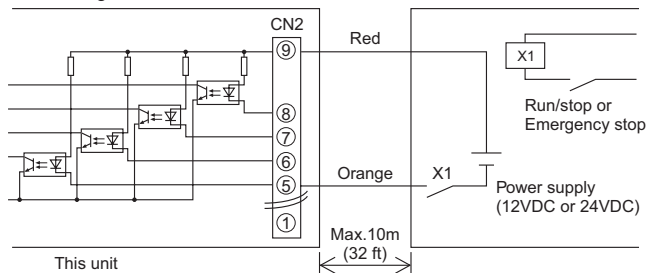
(B) For pulse signal

- ① Even if the ON signal is input during ON, the status will remain ON.
- ② If the local remote controller is prohibited, the ON/OFF operation mode and temperature setting operations by the local remote controller will be prohibited.
- ③ Set the pulse width (contact ON time) to 0.5 to 1 sec.

3. SYSTEM CONTROLLER

4). Recommended circuit example

(A) For level signal



Use relays X1, X2, Y1, and Y2 that meet the following specifications.

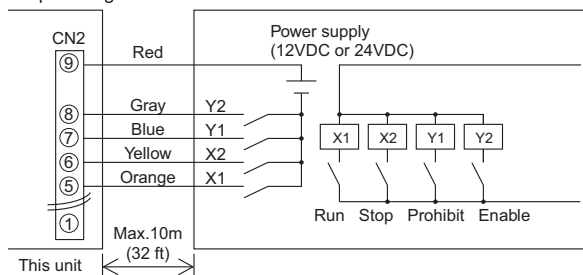
Contact rating

Rated voltage $\geq 12\text{VDC}$

Rated current $\geq 0.1\text{A}$

Minimum applicable load $\leq 1\text{mA at DC}$

(B) For pulse signal



① The contact relay, DC power source, extension cable, etc., must be prepared separately at the site.

② The connection cable can be extended up to 10m (32 ft). (Use a 0.3mm^2 (AWG 22) or larger wire.)

③ Strip the extra cable near the connector, and securely insulate the exposed section with tape, etc.

(2). External signal output function

* External signal output requires the external I/o adapter (Model: PAC-YG10HA) sold separately.

1). External output

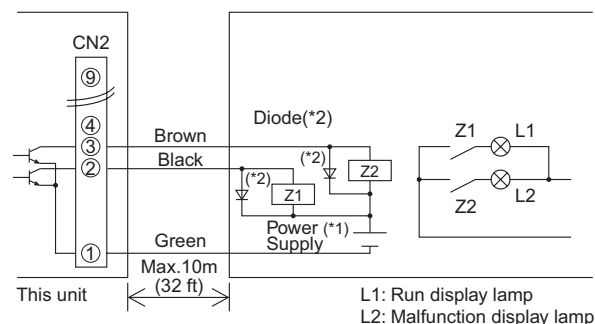
When one or more air conditioners are running, the "ON" signal will be output and if a malfunction occurs in one or more air conditioners, the "Malfunction" signal will be shown.

2). External output specifications

CN 2	Lead wire	Details of each terminal
No.1	Green	Common (External ground)
No.2	Black	ON/OFF
No.3	Brown	Malfunction/normal

① "ON" signal and "Malfunction" signal will both be output.

3). Recommended circuit example



Use Z1 and Z2 relays having the following specifications.

Operation coil

Rated voltage : $12\text{VDC}, 24\text{VDC}$

Power Consumption : 0.9W or less

(*1) Prepare a power supply separately according to the relay being used. (12VDC or 24VDC)

(*2) Always insert a diode on both ends of the relay coil.

① Each element will turn on while ON operation or a malfunction occurs.

② The connection cable can be extended up to 10m (32ft).

③ The relays, lamps, diodes and extension cables, etc, must be prepared separately at the site.

3-7-3. LAN connection function

Connect the LAN cable to the LAN connector of this device.

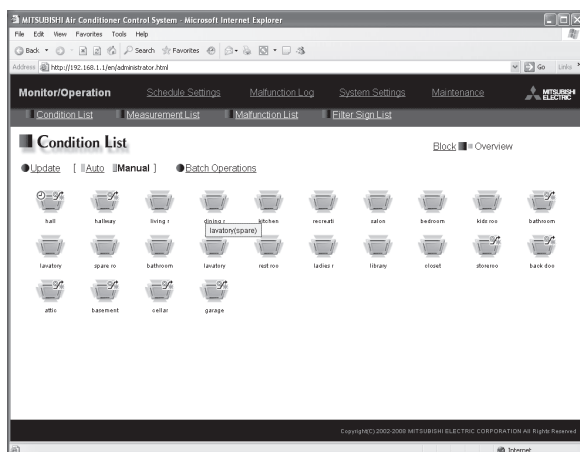
- * Procure the LAN cable at the site, and use an enhanced category 5 UTP cable.
- * For a description of the IP address setting method, refer to Installation Manual.
- * LAN is 10 BASE-T Specification.
- * The maximum wiring length from HUB to GB-24 is 100m [328ft].
- * GB-24 is connected to the monitoring PC via HUB.

NOTE

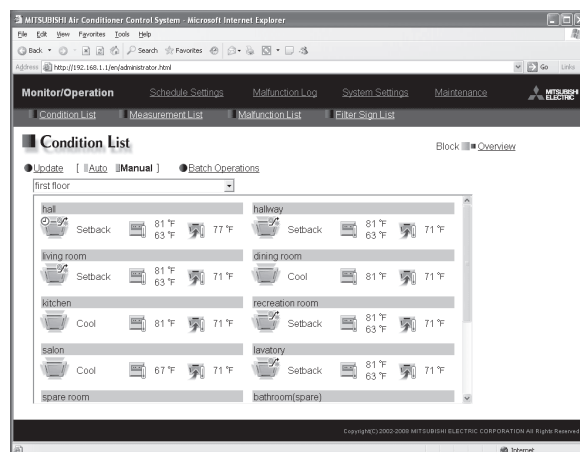
- * Perform the LAN wiring before installation, and wire up to the body by the same method as wiring the M-NET transmission line.
- * When a LAN is already connected, decide the IP address by consultation with the system administrator and connect to the LAN body after changing the IP address.
- * Space for the connector and wiring is required. Refer to Installation Manual.
- * Connect GB-24 to a private network.
Use a security device such as a VPN router when connecting the GB-24 to the Internet to prevent unauthorized access.
(If no security devices are installed, the operation settings may be changed by an unauthorized person without the knowledge of the user.)

3. SYSTEM CONTROLLER

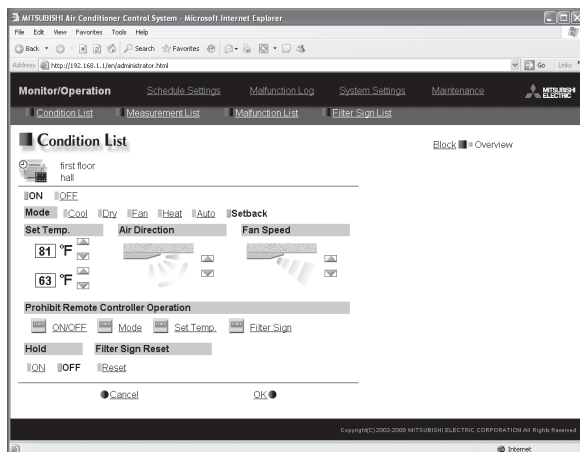
3-7-4. Browser screens of GB-24



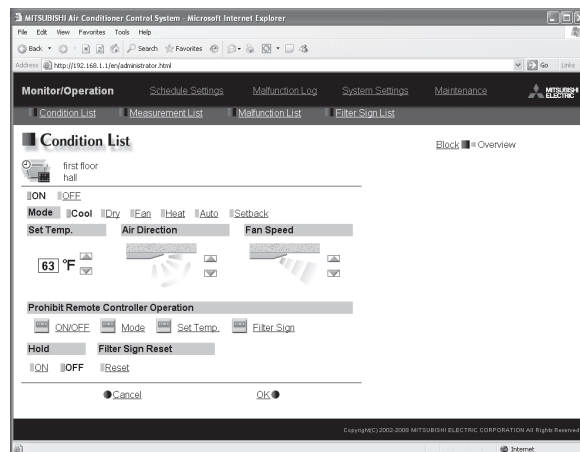
Condition List (Overview)



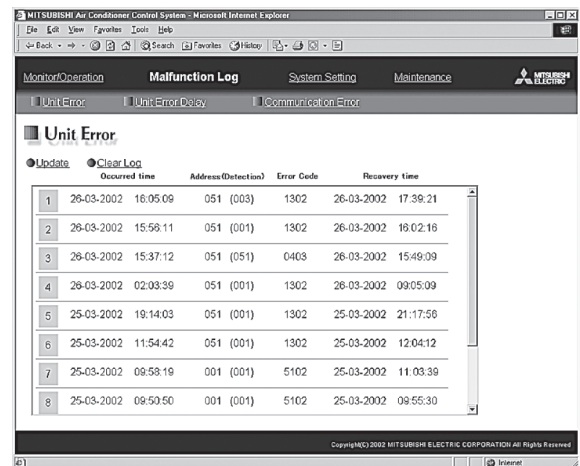
Condition List (Block)



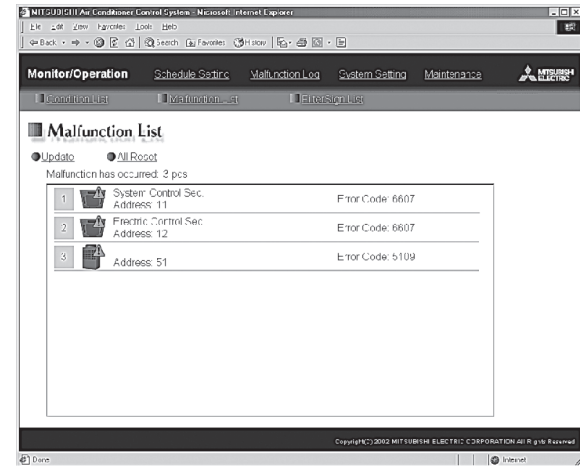
Operation (with Setback)



Operation (without Setback)

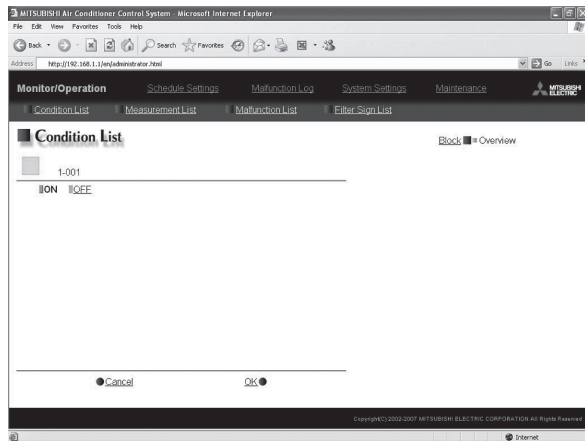


Malfunction Log

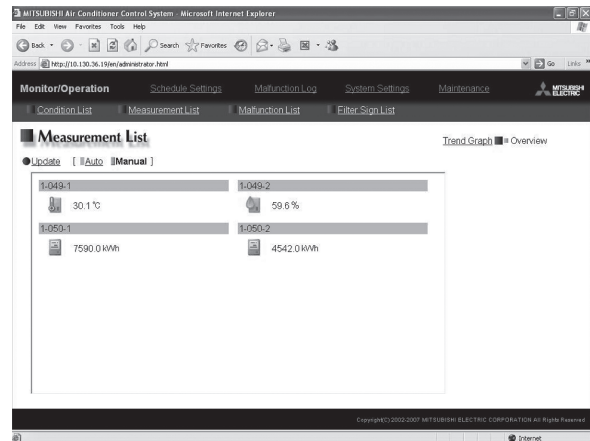


Malfunction List

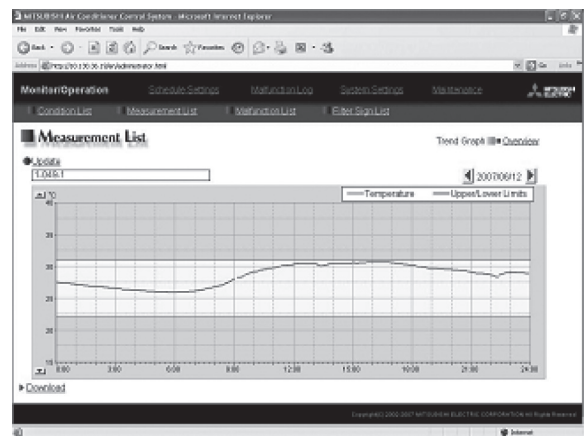
3. SYSTEM CONTROLLER



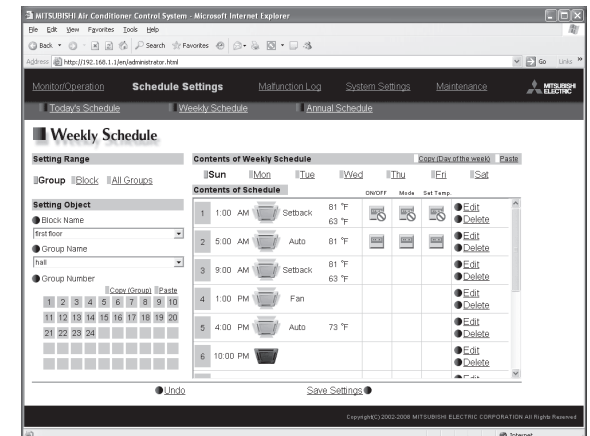
Operation (DIDO Controller)



Measurement status monitor (temperature sensor/humidity sensor/measurement meter)



Trend Graph (temperature/humidity)



Weekly Schedule

3. SYSTEM CONTROLLER

3-8. Power supply unit [PAC-SC51KUA]

PAC-SC51KUA supplies DC power of M-NET (22-30V) and 24V at TB2 and TB3 respectively; the former is for centralized transmission use and the latter is for AG-150 operation and LAN function use.

3-8-1. When using PAC-SC51KUA as the power supplier for system controller, the capacity for system controller is considered as follows.

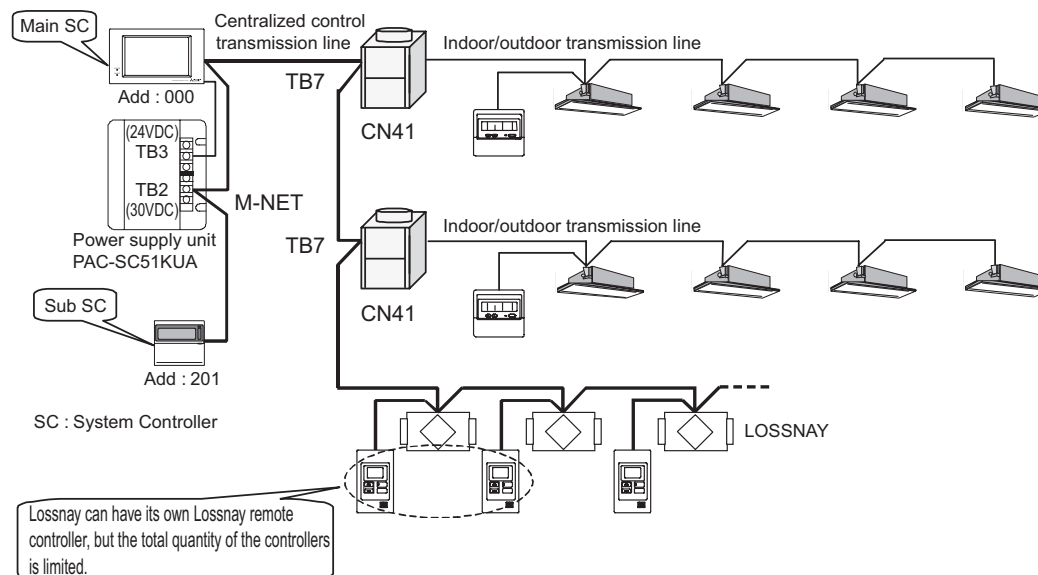


Fig. 1 Equivalent power consumption of controllers

In this case, pay attention to leave the power supply switch connector on CN41 of the Outdoor unit as the factory setting before shipment.

Taking the power consumption of the control board of Indoor unit as 1, the power consumption of various controllers is rated at Table 1.

Table 1 Equivalent power consumption of controllers

Centralized controller*1			Other system controllers		Remote controllers
AG-150	GB-24	TC-24	ON/OFF remote controller (PAC-YT40ANRA)	System remote controller (PAC-44SRA) Schedule timer (PAC-YT34STA)	ME remote controller (PAR-F27MEA) LOSSNAY remote controller (PZ-52SF)
0.5	3	4	1	0.5	0.25

*1: G-50 cannot be connected to PAC-SC51KUA. Use PAC-SC50KUA to connect G-50.

PAC-SC51KUA is capable to supply equivalent power up to 5, therefore the maximum connectable number of system controller is as follows.

Table 2 Max. connectable quantity of controller when using PAC-SC51KUA

Centralized controller*1			Other system controllers		Remote controllers
AG-150	GB-24 TC-24		ON/OFF remote controller (PAC-YT40ANRA)	System remote controller (PAC-44SRA) Schedule timer (PAC-YT34STA)	ME remote controller (PAR-F27MEA) LOSSNAY remote controller (PZ-52SF)
1 unit	1 unit		5 units	10 units	20 units

*1: According to the system restrictions, PAC-SC51KUA can be connected to only one centralized controller.

As the air conditioner control system may combine all kinds of system controllers, the total power consumption of system controllers need to count with Table 2.

For example, the controller system contain 1 AG-150, 2 ON/OFF remote controllers (PAC-YT40ANRA), 1 schedule timer (PAC-TY34STA), 6 Lossnay remote controllers connected at centralized control communication line.

Then the total power consumption is

$$1 \times 0.5 + 2 \times 1 + 1 \times 0.5 + 6 \times 0.25 = 4.5 < 5.$$

One PAC-SC51KUA is therefore enough. The total power consumption should not exceed 5.

3. SYSTEM CONTROLLER

3-2. When supply power to 1 AG-150, the PAC-SC51KUA can supply power to other system controllers as follows.

Table 3 Connectable number of system controller when 1 AG-150 is used.

V : Connectable

		Total number of ON/OFF remote controller(AN)					
		0	1	2	3	4	5
Total number of System remote controller(SR) Schedule timer(ST)	0	V	V	V	V	V	
	1	V	V	V	V	V	
	2	V	V	V	V		
	3	V	V	V	V		
	4	V	V	V			
	5	V	V	V			
	6	V	V				
	7	V	V				
	8	V					
	9	V					
	10						



CAUTION

- When applying Charge and/or Peak-cut function on AG-150, Power Supply Unit (PAC-SC51KUA) is recommended to use. AG-150 is possible to receive power from one of the Outdoor units, but there is a risk that the failure of power supply from the Outdoor unit will cause AG-150's functiondown on the whole system.

3-3. When supply power to 1 GB-24, the PAC-SC51KUA can supply power to other system controllers as follows.

Table 4 Connectable number of system controller when 1 GB-24 is used.

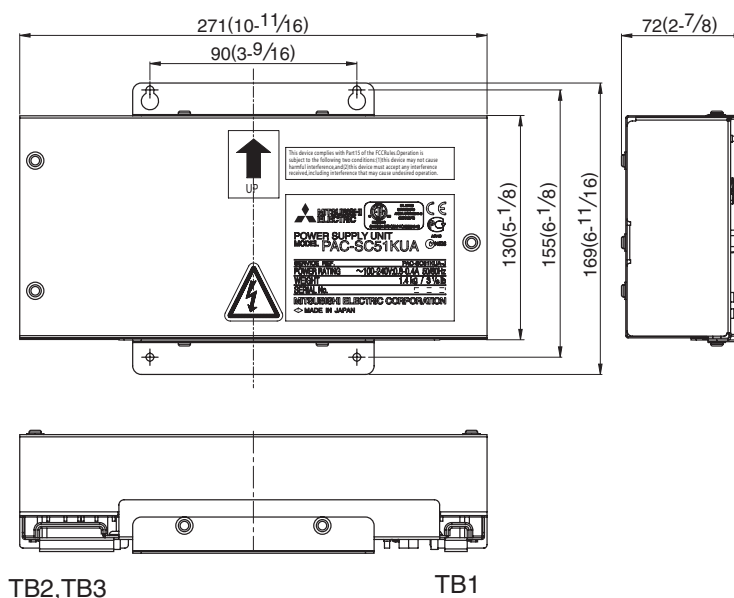
V : Connectable

		Total number of ON/OFF remote controller(AN)					
		0	1	2	3	4	5
Total number of System remote controller(SR) Schedule timer(ST)	0	V	V	V			
	1	V	V				
	2	V	V				
	3	V					
	4	V					
	5						
	6						
	7						
	8						
	9						
	10						

3. SYSTEM CONTROLLER

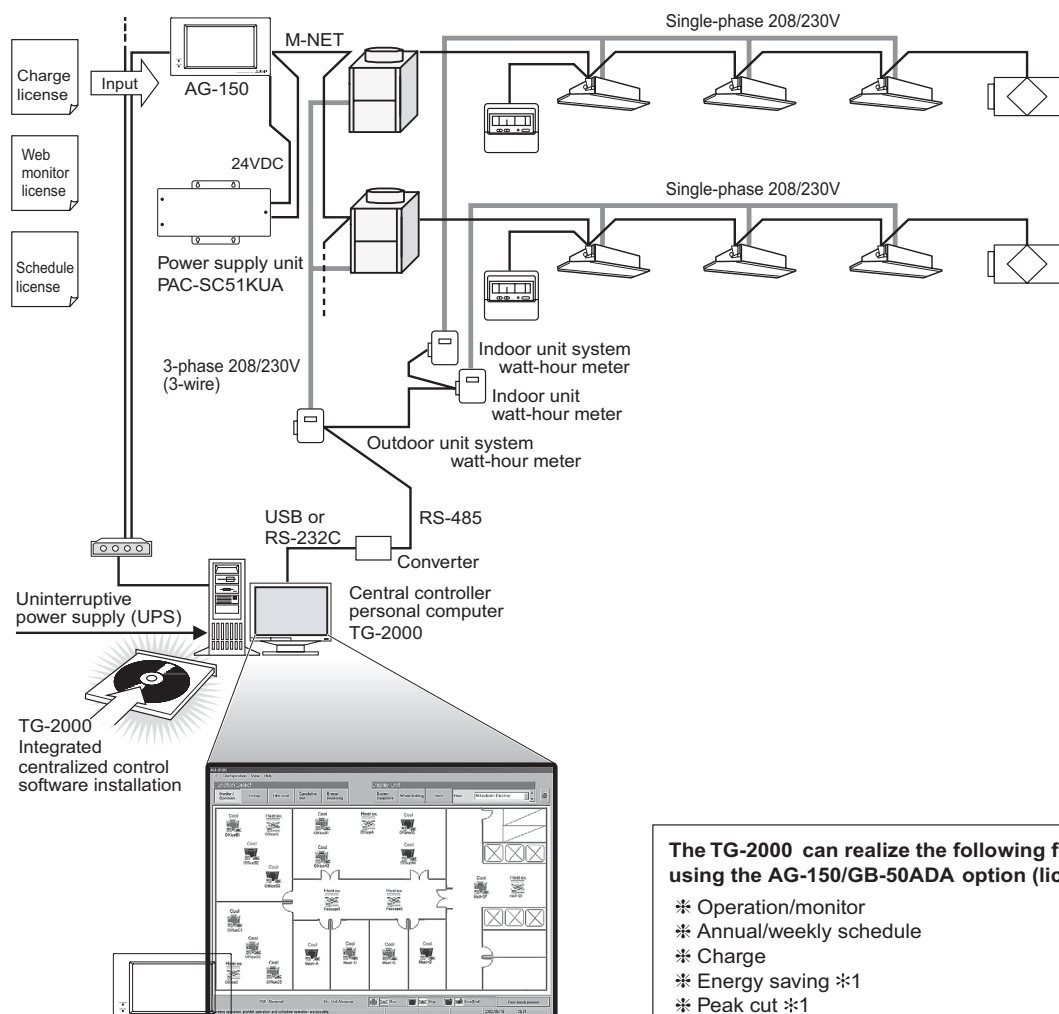
■ External dimension

Unit:mm[in.]



3-9. Integrated centralized control software [TG-2000]

3-9-1. Example of Basic System Configuration.



The TG-2000 can realize the following functions using the AG-150/GB-50ADA option (license).

- * Operation/monitor
- * Annual/weekly schedule
- * Charge
- * Energy saving *1
- * Peak cut *1
- *1: Compatible with TG-2000A Ver. 4.10 and higher, G-50A Ver. 2.51 or later.

■ Main features of TG-2000A

- ① Up to 2000 indoor units (40 AG-150, GB-50ADA units) can be operated and monitored simultaneously
 - ② The air-conditioner layout can be displayed on the screen, making control and operation easier.
 - ③ The annual and weekly schedules can be set. Two schedules, such as the summer master and winter master, can be saved in the weekly schedule.
 - ④ Air-conditioning charges can be calculated based on the multiple air-conditioner usage results. The power apportionment percentage data and apportioned power rate can be calculated for each indoor unit using the power apportionment function, and can be output as a CSV format file. * Power apportionment charging is not possible with the old model, A control or K control.
 - Charging without WHM : The user manually inputs the power rate to calculate the air-conditioning charges. (Using a tool)
 - RS-485 WHM charging : The RS-485 WHM value is automatically tabulated to calculate the air-conditioning charges.
 - ⑤ Night Set-Back function operation is possible with schedule settings. *1,4
 - ⑥ General equipment can be operated and monitored. *2
 - *1: Compatible with TG-2000 Ver. 4.10 or later, G-50 Ver. 2.51 or later.
 - *2: Compatible with TG-2000 Ver. 4.30 or later, G-50 Ver. 2.51 or later.
 - *3: Compatible with TG-2000 Ver. 4.60 or later, G-50 Ver. 2.70 or later.
 - *4: With Night Set-Back function, the CITY MULTI system can run at heating mode with target temperature set to 54°F / 12°C under schedule control. This function can protect the room from dropping down to extremely low temperature at mid-night.
- Note: AG-150 (Ver. 1XX Series) will be compatible with TG-2000 Ver. 5.5 or later. Depending on the versions of TG-2000 and G(B)-50, some functions may not be available.

3. SYSTEM CONTROLLER

3-9-2. List of TG-2000 functions

The data for each GB-50 can be grouped and used to control the operation of up to 2000 units in floor or block units, from the personal computer screen. By using a watt-hour meter or DIDO (PAC-YG66DCA), the power rate can be ap and other general equipment can be controlled.

List of integral software functions

Item	Details	GB-50 license			
		Web monitor	Charge	Schedule	Energy saving
ON/OFF	The units can be turned ON and OFF for all floors or in block, floor or group units.	V			
Operation modes	The operation mode can be switched between COOL, DRY, FAN, AUTO and HEAT for all floors or in block, floor or group units.	V			
Temperature setting	The room temperature can be set for all floors or in block, floor or group units. Set temperature range COOL / DRY : 66°F to 86°F / 19°C to 30°C HEAT : 63°F to 82°F / 17°C to 28°C AUTO : 66°F to 82°F / 19°C to 28°C ※ Depends on indoor unit model.	V			
Fan speed	The fan speed can be set to four stages for all floors or in block, floor or group units.	V			
Air direction	The air direction can be set in four vertical directions or to swing for all floors or in block, floor or group units. (The selectable air direction differs according to the model.)	V			
Interlocked unit ON/OFF (LOSSNAY)	If there is an interlocked unit (LOSSNAY), the unit can be turned ON (strong/weak) or OFF for all floors or in block, floor or group units. (The ventilation mode cannot be selected for interlocked units.)	V			
Local operation prohibit	The items for which operation with the local remote controller are to be prohibited can be selected for all floors or in block, floor or group units. (The items that can be prohibited are ON/OFF, operation mode, set temperature and filter sign reset.)	V			
Annual / weekly schedule	The annual/weekly schedule function can be used by registering the license. Two settings, such as seasonal settings for summer and winter, can be saved.	V		V	
Power rate apportionment charging (power rate manual input)	By registering the AG-150/GB-50ADA unit license number, power rate apportionment percentage data for each indoor unit can be output in CSV format. The power rate for each tenant can be easily calculated by having each user input the power rate manually.	V	V		
Power rate apportionment charging	An RS-485 watt-hour meter is connected to calculate the air-conditioning charges based on the amount each tenant's air-conditioner has operated. Two charging rates can be applied per day.	V	V		
History	Up to 3000 items for the error history and up to 10000 items for operation history can be saved. Each history file can be output as a daily report or monthly report in CSV format. The max. no. of error history data that can be saved depends on the type of errors and the no. of connected AG-150/GB-50ADA units. The operation history consists only of the operations carried out with the TG-2000, and is limited to some limited operation items.	V			
Operation time monitor	The cumulative operation time of each indoor unit can be viewed or output as a CSV format file. (This function is valid only when the charging function license is registered.)	V	V		
Filter sign display mask	Automatic display of the filter sign can be disabled. (System batch.) In this case, the filter sign state is confirmed with manual operations.	V			
Night Set-Back function ※1,2	Heating from 54°F / 12°C and higher can be set using the schedule.	V		V	
Set temperature limit ※1	The set temperature lower limit can be set for cooling and the upper limit for heating.	V			
Control other general equipment	The ON/OFF status of the connected general equipment and the error status can be changed or monitored from the DIDO (PAC-YG66DCA).	V			

※1: Compatible with TG-2000 Ver. 4.10 or later, G-50 Ver. 2.51 or later.

※2: With Night Set-Back function, the CiTY MULTI system can run at heating mode with target temperature set to 54°F / 12°C under schedule control.
This function can protect the room from dropping down to extremely low temperature at midnight.

Note: Depending on the versions of TG-2000 and G(B)-50, some of the functions may not be available for use.

3. SYSTEM CONTROLLER

- (2). The data for each AG-150 can be grouped and used to control the operation of up to 2000 units in floor or block units, etc., from the personal computer screen. By using a watt-hour meter or DIDO (PAC-YG66DCA), the power rate can be apportioned, and other general equipment can be controlled.

List of integral software functions

Item	Details	AG-150 license		
		Web monitor	Schedule	Energy management
ON/OFF	The units can be turned ON and OFF for all floors or in block, floor or group units.	V		
Operation modes	The operation mode can be switched between COOL, DRY, FAN, AUTO and HEAT for all floors or in block, floor or group units.	V		
Temperature setting	The room temperature can be set for all floors or in block, floor or group units. Set temperature range COOL / DRY : 19°C to 30°C / 66°F to 86°F HEAT : 17°C to 28°C / 63°F to 82°F AUTO : 19°C to 28°C / 66°F to 82°F * Depend on the model	V		
Fan speed	The fan speed can be set to four stages for all floors or in block, floor or group units.	V		
Air direction	The air direction can be set in four vertical directions or to swing for all floors or in block, floor or group units. (The selectable air direction differs according to the model.)	V		
Interlocked unit ON/OFF (LOSSNAY)	If there is an interlocked unit (LOSSNAY), the unit can be turned ON (strong/weak) or OFF for all floors or in block, floor or group units. (Note that the ventilation mode cannot be selected for interlocked units.)	V		
Local operation prohibit	The items for which operation with the local remote controller are to be prohibited can be selected for all floors or in block, floor or group units. (The items that can be prohibited are ON/OFF, operation mode, set temperature and filter sign reset.)	V		
Annual / weekly schedule	The annual/weekly (season: weekly x 2) schedule function can be used by registering the license. Five settings, such as seasonal settings for summer and winter, can be saved.	V	V	
Power rate apportionment charging (power rate manual input)	By registering the AG-150/GB-50ADA unit license no., the power rate apportionment percentage data for each indoor unit can be output in CSV format. The power rate for each tenant can be easily calculated by having each user input the power rate manually.	V		V
Power rate apportionment charging	An RS-485 watt-hour meter is connected to calculate the air-conditioning charges based on the amount each tenant's air-conditioner has operated. Two charging rates can be applied per day.			
History	The error history and up to 10000 items for operation history can be saved. Each history file can be output as a daily report or monthly report in CSV format. The maximum number of error history data that can be saved depends on the type of errors and the number of connected AG-150A units. The operation history consists only of the operations carried out with the TG-2000A, and is limited to some limited operation items.	V		
Operation time monitor	The cumulative operation time of each indoor unit can be viewed or output as a CSV format file. (This function is valid only when the charging function license is registered.)	V		V
Filter sign display mask	Automatic display of the filter sign can be disabled. (System batch.) In this case, the filter sign state is confirmed with manual operations.	V		
Night Set-Back function *1	Heating from 12°C / 54°F and higher can be set using the schedule function.	V		
	This function helps keep the indoor temperature in the temperature range while the units are stopped and during the time this function is effective.	V		
Set temperature limit *2	The set temperature lower limit can be set for cooling and the upper limit for heating.	V		
Control other general equipment	The ON/OFF status of the connected general equipment and the error status can be changed or monitored from the DIDO(PAC-YG66DCA).	V		

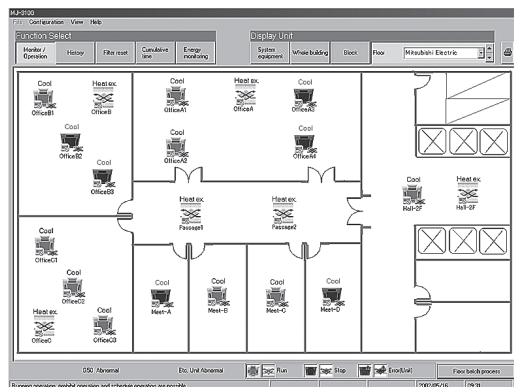
*1 : With Night Set-Back function, the CITY MULTI system(PUMY models excluded) can run at heating mode with target temperature set to 12°C / 54°F under schedule control. (It depends on the outdoor unit model.) This function can protect the room from dropping down to extremely low temperature at midnight.

*2 : This function cannot be used with the MA remote controller. (It depends on the indoor unit model.)

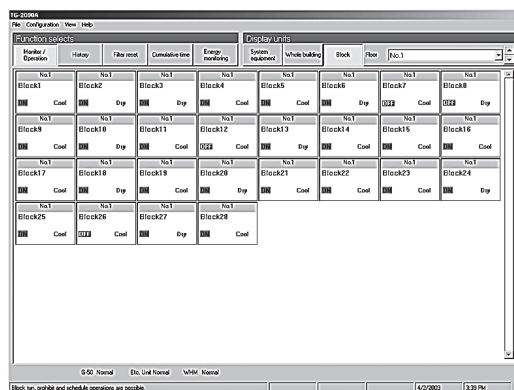
Note : Depending on the versions of TG-2000 and AG-150, some of the functions may not be available for use.

3. SYSTEM CONTROLLER

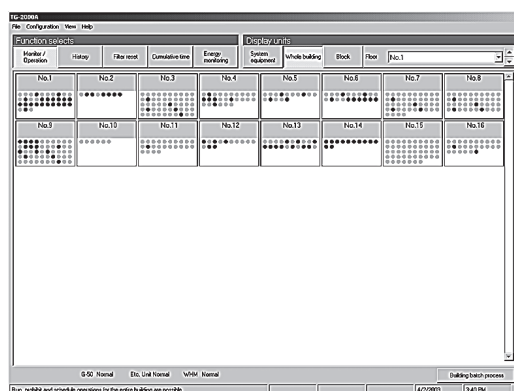
3-9-3. Browser screens of TG-2000



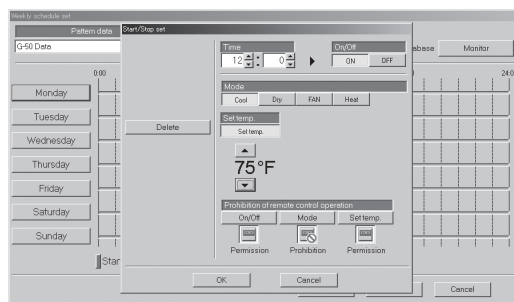
Floor screen



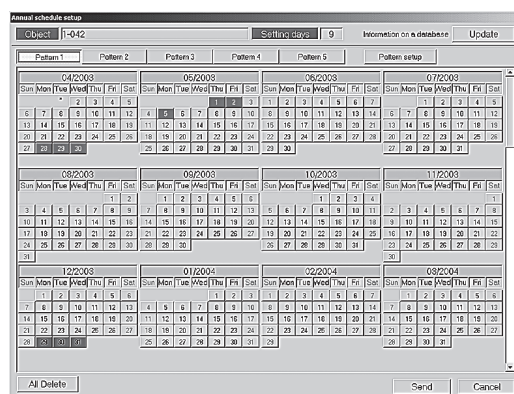
Block screen



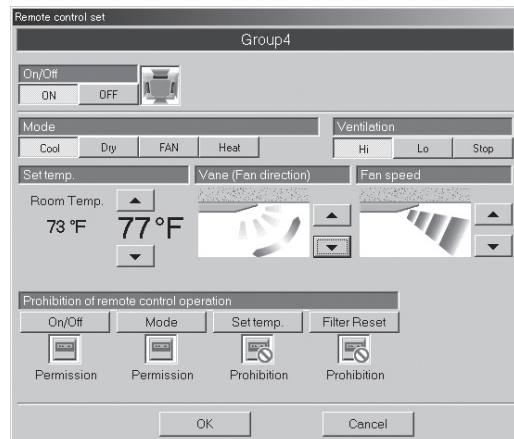
All floor screen



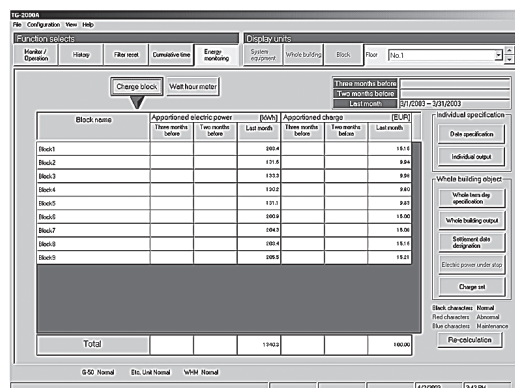
Weekly schedule screen



Annual schedule screen



Operation setting screen



Air-conditioning charge screen

3. SYSTEM CONTROLLER

3-9-4. Requirements (system recommendations)

We recommend the following software and hardware when using this application (TG-2000).

	TG-2000 version	System Requirements
When AG-150/GB-50ADA-compatible TG-2000 is used	TG-2000 Ver.5.50 or later *1	OS : Windows Vista/XP Refer to the table below for details.

*1 : TG-2000 Ver.5.20 is upgraded to Ver.5.50 or later.

Item	Requirement		Recommended
PC	PC/AT interchangeable machine (Recommended: IBM, HP,DELL)		Operation check completed, using, HP and DELL (Business model is recommended)
CPU	Core™ 2 Duo 1.66GHz or faster (Windows Vista for Core 2 Duo)		Core™ 2 Duo 2.4GHz or faster
	Pentium® M 1.7GHz or faster		Pentium® M 2.0GHz or faster
	Pentium® 4 2.4GHz or faster		Pentium® 4 2.8GHz or faster
Memory	In Windows Vista : 1GB or more		2GB or more
	In Windows XP / 2000 : 512MB or more		1GB or more
HDD	Standard	6GB or more (2GB or more of C drive free space necessary)	40GB or more of C drive free space necessary When using the trend function, the drive used for automatic output must have the following free space according to the number of groups. 200 groups = 2GB, 500 Groups = 5GB, 1000 groups = 10GB, 2000 groups = 20GB
	Wide area	20GB or more (Free space)	Standard : max. 200MB/site
Storage device	CD-ROM drive, USB drive		Devices other than those shown at the left may also be installed.
Resolution	1024 x 768 or higher, 65536 colors or more		
Serial port	1 port or more		Required when using RS-485 communication WHM
LAN	1 port (10BASE-T/100BASE-TX)		* 1
Modem	56K modem or TA		Required when using a modem in wide area mode.
USB	2 port or more		It uses it for the data backup.
OS	Windows® Vista Business Service Pack 2		English version only *Computer must support each OS.
	Windows® XP Professional Service Pack 3 *2		English version only *Computer must support each OS.
	Windows® 2000 Professional Service Pack 4 *2		English version only *Computer must support each OS.
Other	Computer must be dedicated for this use (TG-2000).		Must be used for 24-hour constant operation (Only some functions. Refer to the TG-2000 manual for details.)

*1 Purchase the option, or use the equipment recommended for the computer when purchasing the computer.

*2 Make sure that the correct version of Service Pack is installed. If the wrong version of Service Pack is installed, TG-2000 will not be set up properly.

* The above contents are subject to change along with TG-2000 version upgrade.

3. SYSTEM CONTROLLER

3-9-5. Compatible Units

The TG-2000 has two main functions: centralized control of air conditioners and cost accounting. However, not all functions are available with all air conditioners.

Table: Compatible units and function list (○ : supported, △ : Certain restrictions apply, × : Not supported)

Model	Function	Control/ Maintenance	Charging (Billing) without WHM	Charging (Billing) with WHM	Energy Saving /Peak Cut
Y series		○	○ *1		○
H2i series		○	○ *1		○
R2 series		○	○ *1		○
WR2 series		○	○ *1		○
WY series		○	○ *1		○
S series		○	○ *1		○ *6
Indoor unit		○	○ *2		○
LOSSNAY		○	○ *3		△ *7
Air To Water Booster unit		○	×	△ *11	△ *12
Air To Water HEX unit		○	×	△ *11	△ *12
"A" control type *4	○ (Adapter required)		○ *1,5		△ *8
Room Air Conditioner	○ (Adapter required)		×	△ (Requires separate watt hour meters Bills calculated based on the reading of each watt hour meter)	△ *10

*1 : Can be calculated for each charging block. May not be available with some older models.

*2 : Indoor unit models before Free Plan models do not support a charge apportioning billing method based on the "capacity save". The existence of even a single unit of those types in the system requires that the method of charge apportioning billing be set to either "Thermo on time" or "Fan operation time".

*3 : LOSSNAY groups to which the remote controller is connected support the charging system.

*4 : Not all of the A-control units support these functions. The calculation of the charge for the auxiliary heater may not be handled by these units.

*5 : For A-control units, use the apportioned charging methods that are listed in "Thermo on time" or "Fan operation time" section.

Otherwise, install an watt-hour meter for each unit.

*6 : Outdoor unit capacity control function is not available.

*7 : Only the function to stop the units is available.

*8 : Inverter models support the outdoor unit capacity save control function.

*9 : Outdoor unit Thermo-OFF control function is not supported. Only the fan speeds control function is available.

*10 : Only the temperature control function or the function to stop the units is available.

*11 : For the charge apportioning of Air To Water Booster unit and Air To Water HEX unit, connect the unit to individual watt-hour meter.

Although only the heating capacity is listed in the specification of Air To Water Booster unit, the "cooling" value is used for the Capacity and Power input of indoor unit parameter for Energy-Monitoring Set Up.

The setting is already made with the cooling value for the models registered in Set-up of model name.

For Air To Water Booster unit and Air To Water HEX unit, the charging function supports only the primary refrigerant system of those units.

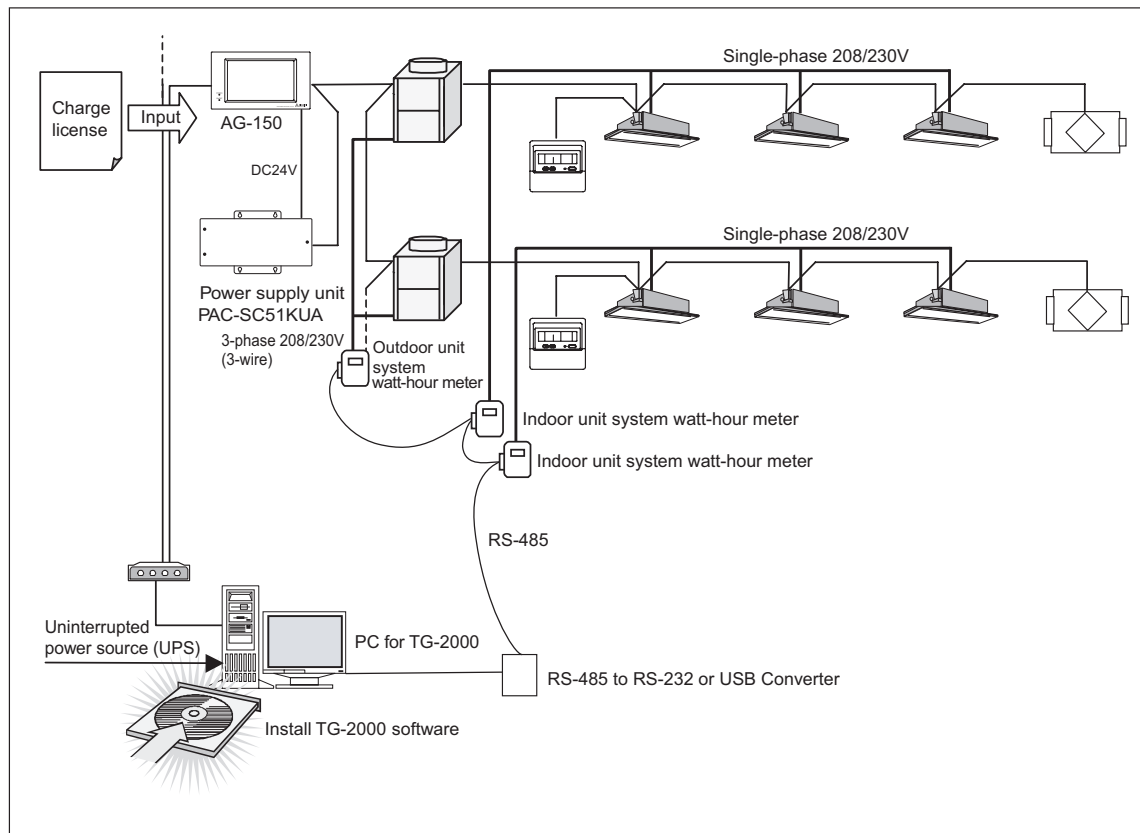
(Each unit obtains the reading of its watt-hour meter.)

*12 : Capable of Thermo-OFF control (fan operation control) and bringing the units to stop only.

3-10. Electronic amount count software [PAC-YG11CDA (SW-CHANGE)]

MITSUBISHI ELECTRIC offers charging function for the air conditioner system. Detailed output of every indoor on electricity consumption of air-conditioning is available. The electricity consumption of air-conditioner is counted based on the refrigerant consumption of every indoor unit, which makes the proportion of electricity consumption precise.

■ System example



■ Necessary parts for the system

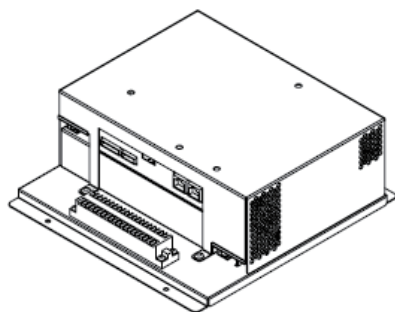
Name (Model name)	Manufacturer	Remarks
PC for central control	PC/AT convertible unit	Confirmed operation of IBM, DELL, Hp Compaq. For details, refer to G-50 Technical Manual.
TG-2000	MITSUBISHI ELECTRIC	
Charge license	MITSUBISHI ELECTRIC	Requires for each AG-150/GB-50ADA.
Web monitor license	MITSUBISHI ELECTRIC	Requires for each AG-150A/GB-50ADA.
PAC-YG11CDA (SW-CHANGE)	MITSUBISHI ELECTRIC	For details, refer to G-50 Technical Manual.
Watt-hour meter with pulse oscillator	MITSUBISHI ELECTRIC	For the specification of the watt-hour meter, refer to G-50 Technical Manual.
Uninterrupted power source (UPS)		Field supplied.

3. SYSTEM CONTROLLER

3-11. BM Adapter [BAC-HD150] (BTL Listed)

CITY MULTI can easily combine into a Building Management System (BMS) via the BACnet® and M-NET adapter BAC-HD150. BACnet is an opened transmission protocol widely used at BMS, and related equipment control. CITY MULTI is therefore compatible with large-scaled BMS management via BACnet. BAC-HD150 can control up to 50 units/groups(including LOSSNAY).

■ Specifications



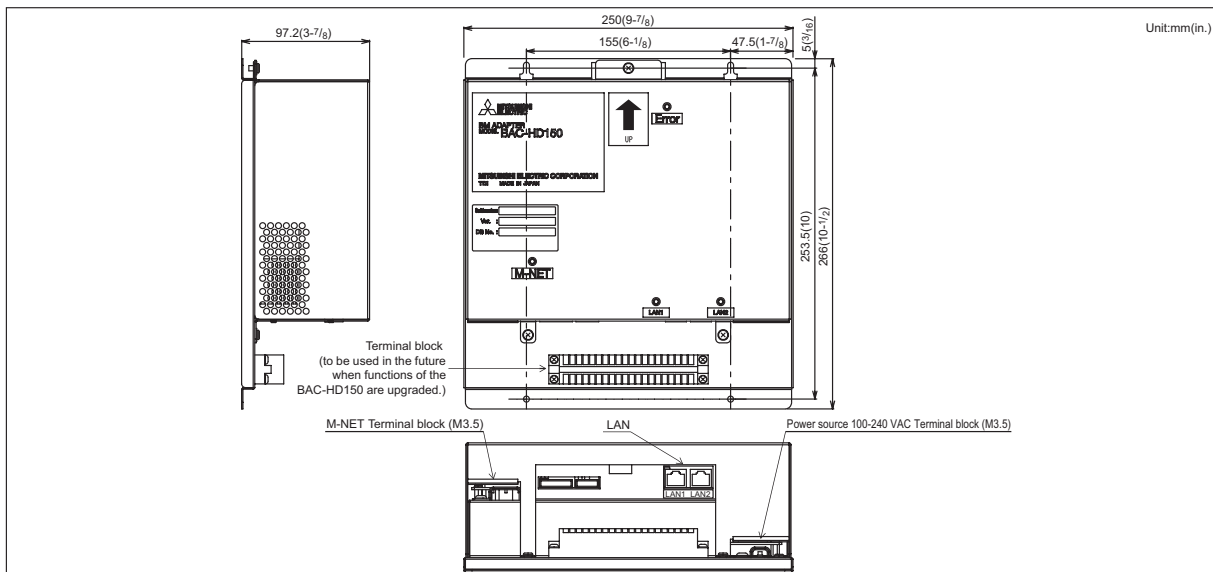
Items			Specifications
Power source	Rated input		100-240 VAC $\pm$ 10 % 0.4-0.3 A 50/60 Hz
	Fuse		250 VAC 3.15 A Time-delay type (IEC127-2 S.S.5)
Interface	Rated output of the power supply to M-NET transmission lines		22-30 VDC
	LAN 1 (for BACnet)		10Base-T or 100Base-TX
	LAN 2 (Initial Setting Tool)		
Ambient conditions	Temperature	Operating temperature range	-10 ~ 55°C (14 ~ 131°F)
		Storage temperature range	-20 ~ 60°C (-4 ~ 140°F)
	Humidity		30 ~ 90 %RH (Non-condensing)
	Dimensions		266 (H) × 250 (W) × 97.2 (D) mm (10-1/2 (H) × 9-7/8 (W) × 3-7/8 (D) in.)
Weight			2.8 kg (6-3/16 lbs.)
Installation conditions			Inside the enclosure (indoor)

■ Functions

Communication items at BM Adapter

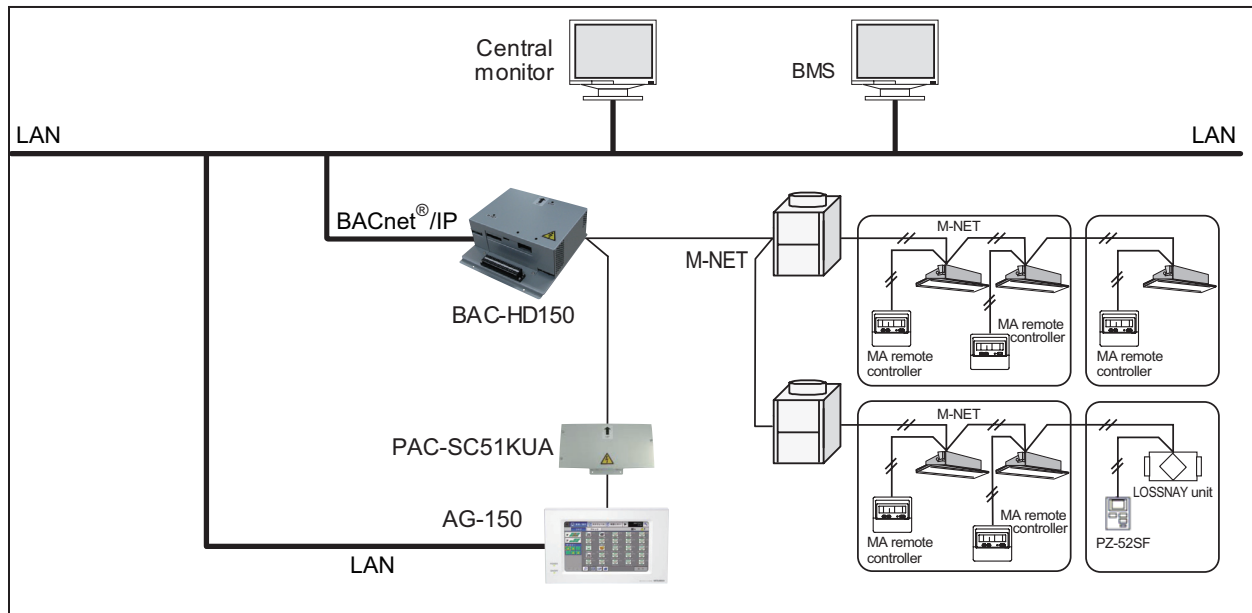
Operation	State Monitoring
On/Off	On/Off
Mode	Mode
Fan Speed	Fan Speed
Air Direction	Air Direction
Set Temp.	Set temp.
Filter Sign reset	Filter sign
Prohibit local On/Off	Indoor temperature
Prohibit local Mode	Prohibit local On/Off
Prohibit local Filter sign reset	Prohibit local Mode
Prohibit local Set Temp.	Prohibit local Filter sign reset
Forced Off	Prohibit local Set Temp.
	Alarm signal
	Error code
	Communication state

■ External Dimensions



3. SYSTEM CONTROLLER

System Example (Connecting 50 units/groups)



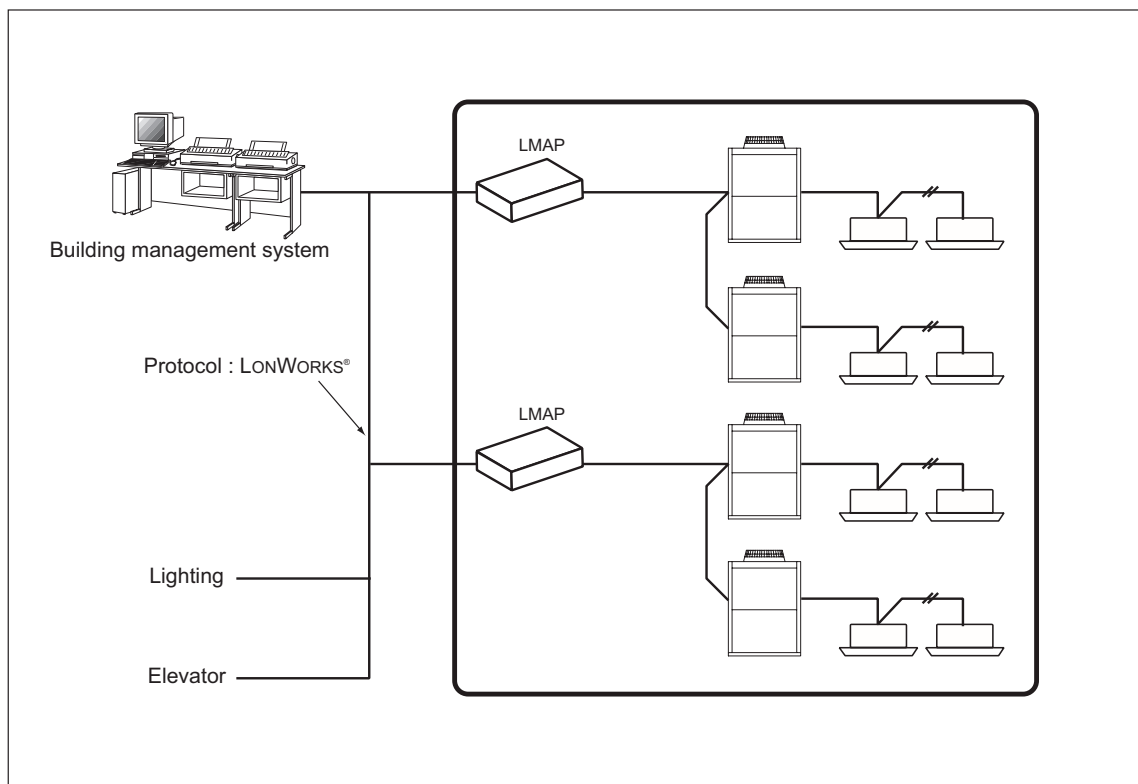
3. SYSTEM CONTROLLER

3-12. LonWorks® interface [LMAP03U]

CITY MULTI® can easily combine into a Building Management System (BMS) via the LONWORKS® and M-NET adapter LMAP03U. LONWORKS® is an opened transmission protocol widely used at BMS and related equipment control. CITY MULTI® is therefore compatible with large-scaled BMS management via LONWORKS®.

One LMAP03U serves up to 50 indoor units. (CITY MULTI®, Mr. Slim®, and LOSSNAY®.)

■ System example



Communication items at LONWORKS® and M-NET Adapter LMAP03U

Operation	On/Off Mode Set point from network (Set temp.) Fan speed	State Monitoring	On/Off Mode Set point from network (Set temp.) Fan speed
	Prohibit local On/Off Prohibit local Mode Prohibit local Set temp. Batch Off		Thermo On/Off Indoor temperature Alarm signal Prohibit local On/Off Prohibit local Mode Prohibit local Set temp.

3. SYSTEM CONTROLLER

■ Environment specification

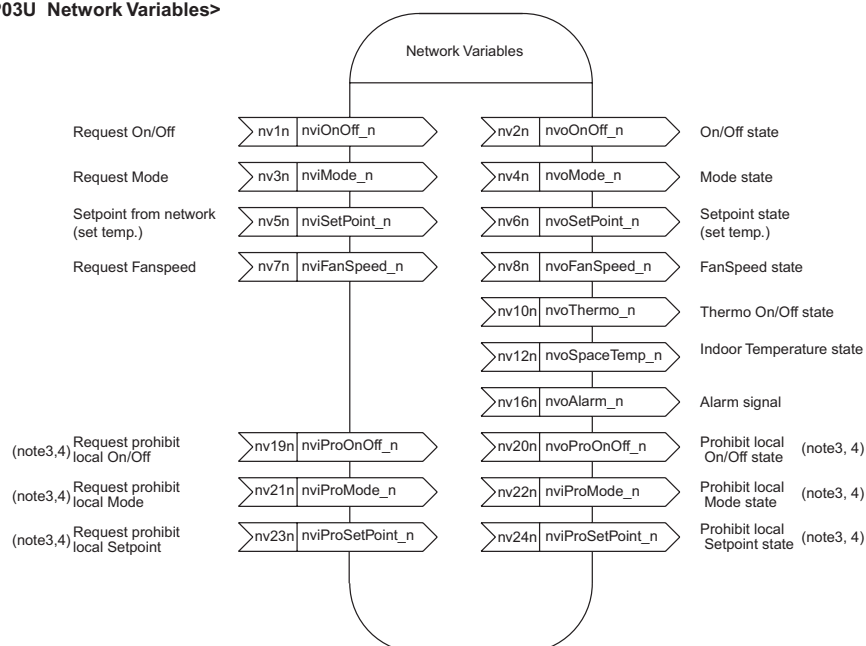
Item	Description
Connected Equipment	MITSUBISHI ELECTRIC Multiple split-type air conditioners CITY MULTI Split-type air conditioners Mr.Slim Heat recovery ventilators LOSSNAY (*For details of the connectable models,please contact the dealer.)
Number of Units	LMAP can control 50 indoor units (including LOSSNAY)
Neuron CHIP	TMPN3150 (10MHz)
Network Transceiver	FTT-10A (Free Topology 78kbps)
Performance	Average communication capacity 2.5 inputs/second
	Peak communication capacity 50 inputs/second (for one second)

* The proper communication is not obtainable when communication intervals exceed its performance, assure sufficient intervals.

* ACK Service is recommended for the network service.

* Detailed specifications for the LONWORKS® network can be found in "FTT-10A Free Topology Transceiver User's Guide" by Echelon Corporation.

<LMAP03U Network Variables>



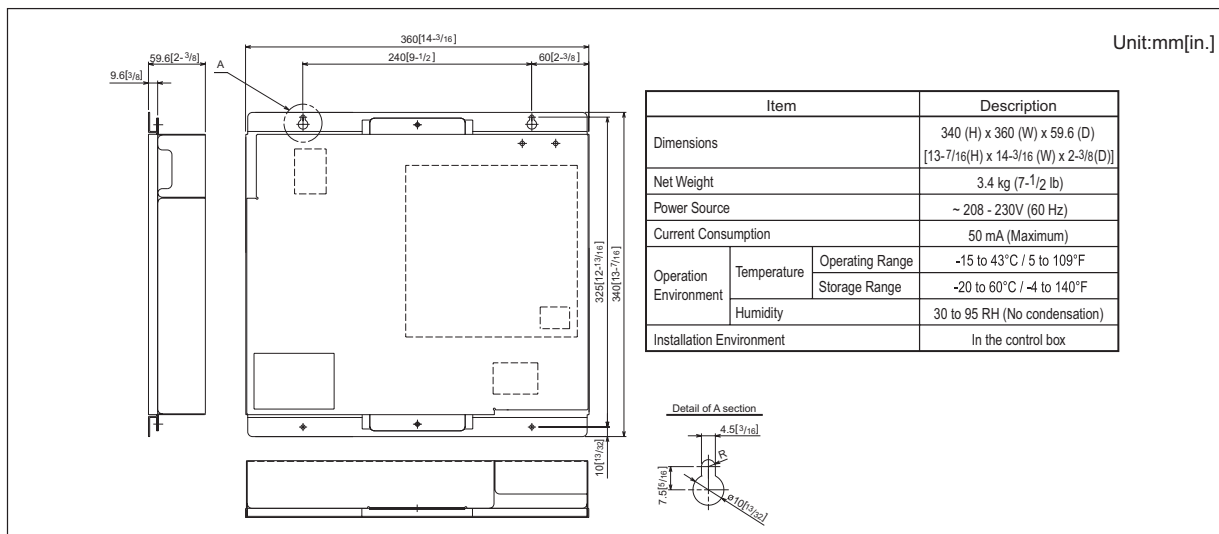
(note1) The case of CITY MULTI is indicated.

(note2) There is a case which cannot be used with the system configuration of the air conditioners units.

(note3) "n" of the network variable shows indoor unit address (M-NET).

(note4) It is possible to use when the "MA" remote controller.

■ External dimension



3. SYSTEM CONTROLLER

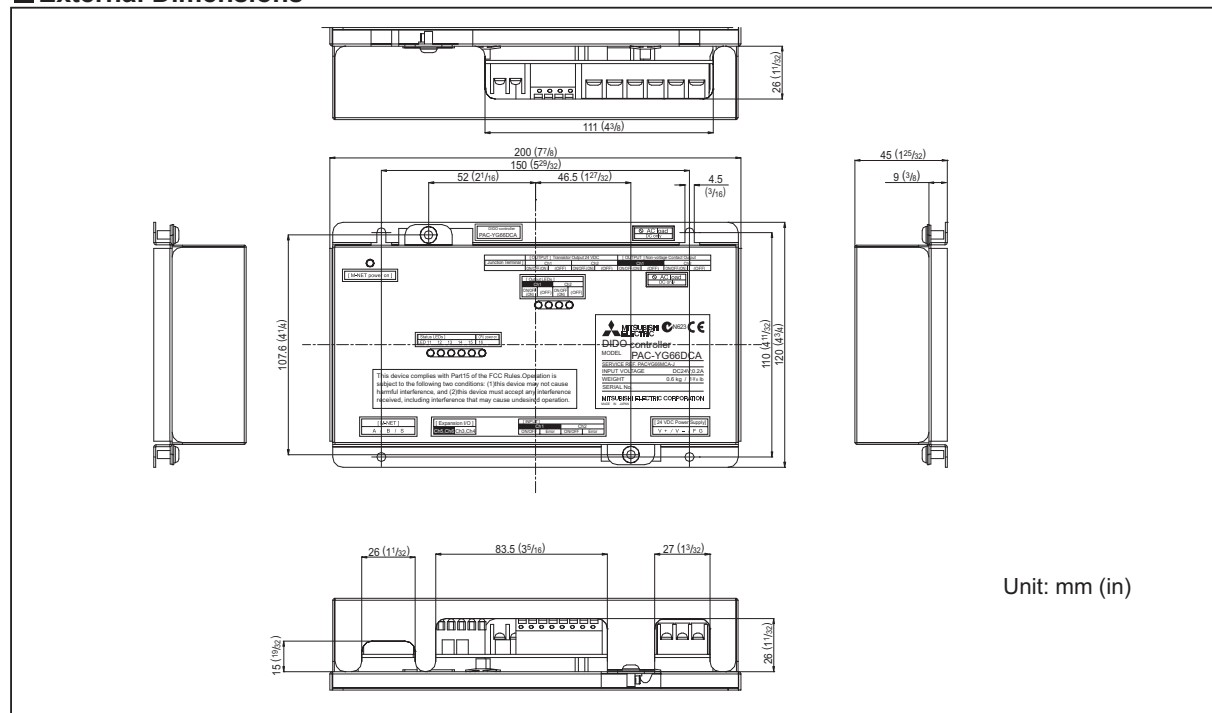
3-13. DIDO controller [PAC-YG66DCA]

The DIDO controller is used in combination with a(n) AG-150/GB-50ADA/GB-24/TC-24 to operate general-purpose equipment, as well as to monitor operating and error status. It is equipped with two sets of standard terminals (Channels 1 and 2), and four sets of expansion connectors for the input/output terminals. Expansion cable is optional.

Other devices can only be controlled from AG-150/GB-50ADA/GB-24 Web browser and TG-2000. Operation can be monitored or performed from the AG-150/TC-24 display.

In addition, this device includes a function that interlocks M-NET devices such as indoor units, general equipment, etc.

■ External Dimensions



⚠ CAUTION

Usage Restrictions

- Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predictable or unpredictable); and secondary or accidental damages, and damages to other objects. We also do not take financial responsibility for opportunities lost as a result of device failure, or electrical power failure at the end-user site.

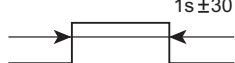
Mitsubishi Electric does not take financial responsibility caused by end-users' requests including, but not limited to, device testing, startup, readjustment, and replacement.

- Do not use this device in disaster prevention, security, or "critical to life" applications.
- It is recommended to provide an external switch for general-purpose equipment in case of a failure of the DIDO controller or a peripheral part.

3. SYSTEM CONTROLLER

3-13-1. Specifications

3-13-1-1. Device Specifications

Item	Rating and Specification						
Power Supply	24 VDC ±10%: 5 W (*1)					Screw terminal block (M3) (*8)	
Interface	M-NET communication		17 to 30 VDC (*2)			Screw terminal block (M3) (*8)	
	Standard	Output (*3)	ON/OFF, (ON) (*4)	Non-voltage Relay contact (2)	Applied load MAX: 24 VDC, 5 W MIN: 5 VDC, 2 mW * AC loads cannot be connected.	Screw terminal block (M3.5) (*8)	
				Transistor (2)	24 VDC 40 mA or less (*5)	Screwless terminal block	
			(OFF) (*4)	Non-voltage Relay contact (2)	Applied load MAX: 24 VDC, 5 W MIN: 5 VDC, 2 mW * AC loads cannot be connected.	Screw terminal block (M3.5) (*8)	
				Transistor (2)	24 VDC 40 mA or less (*5)	Screwless terminal block	
		Input	ON/OFF	Non-voltage a contact (2 each)	24 VDC 1 mA or less (*6)	Screwless terminal block	
			Error/Normal				
		Expansion	Output	ON/OFF, (ON) (*4)	Transistor (4 each)	24 VDC 40 mA or less (*5)	9 pin connector
				(OFF) (*4)			
	Input		ON/OFF	24 VDC input (4 each)	24 VDC 1 mA or less (*7)	9 pin connector	
	Error/Normal						
Output Pulse Width		1s ± 30 ms					
Interlock Function	Interlock M-NET devices and output contacts according to status of input contacts. (*8)						
Environment Conditions	Temperature		Operating temperature range	0 to 40°C[32°F to 104°F]			
			Storage temperature range	-20 to 60°C[-4°F to 140°F]			
	Humidity		30 to 90%RH (no condensation)				
Dimensions	200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 1 25/32 (D) in						
Weight	0.6 kg / 1 3/8 lb						
Time Backup During Power Failure	In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)						
Installation Environment	Inside a control panel (indoors) * Use this product in a hotel, a business office environment or similar environment.						

*1: For details, refer to "3-13-1-2. Parts Purchased Separately".

*2: Supply electric power from a power unit for the transmission line or an outdoor unit.

Furthermore, the power consumption factor of the M-NET circuitry of this device is "1/4" (equivalent to one ME Remote Controller).

*3: Non-voltage Relay contact or transistor is available for output. Only one can be used at a time.

*4: () is in the case of a pulse.

*5: The output is open collector type. Power must be supplied from an external power source to the output circuit of this device.

*6: Power is supplied from this device to the external contacts.

*7: Power must be supplied from an external power source.

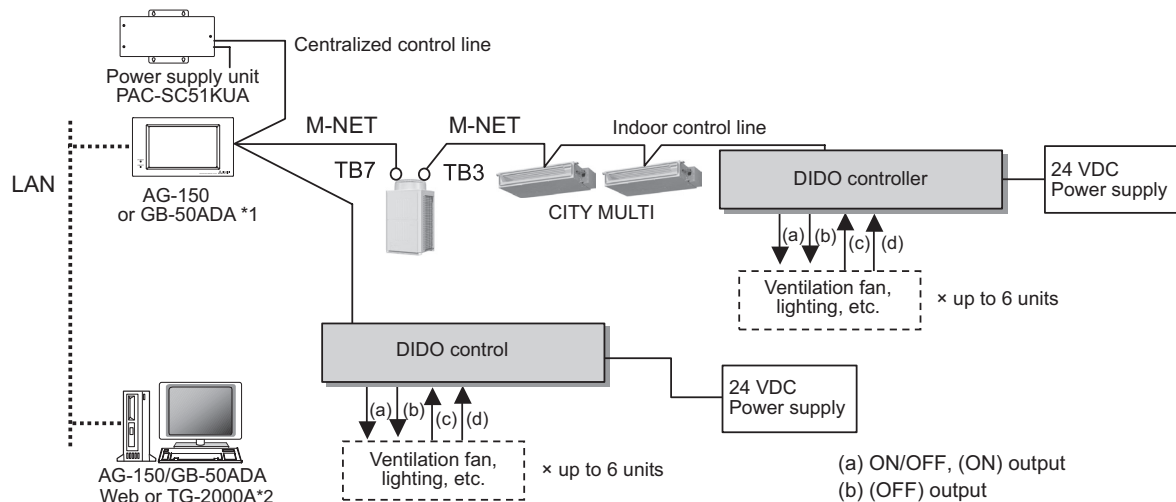
*8: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread).

The number indicates the screw diameter (mm).

3. SYSTEM CONTROLLER

3-13-1. Specifications

3-13-1-1. Device Specifications



* This figure omits the power supply line and only shows the transmission line.

*1: The GB-50ADA will be supported on TG-2000 Ver. 6.3 or later.

*2: The DIDO controller can be connected to TG-2000 with Ver.5.60/5.30 or later.

(a) ON/OFF, (ON) output

(b) (OFF) output

(c) ON/OFF input

(d) Error/Normal input

Standard: Terminal block (for 2 units)

Expansion: Connectors (for 4 units)

Total: 6 units

<Restrictions>

Maximum of 50 units (50 channels) per AG-150/GB-50ADA, 24 units (24 channels) per GB-24A and TC-24.

However, the number of units that can be connected to a(n) AG-150/GB-50ADA is up to 50 (24 for the GB-24 and TC-24) including the number of contacts used on this device, an indoor unit, LOSSNAY unit, etc.

Up to 6 contacts can be connected to the DIDO controller (1 M-NET address per contact). One contact connected to this device is calculated as the equivalent of one indoor unit connected to AG-150/GB-50ADA/GB-24/TC-24.

For example, 5 contacts connected to the DIDO controller are calculated as the equivalent of 5 indoor units connected to AG-150/GB-50ADA/GB-24/TC-24.

NOTE

- For the shield ground of the M-NET centralized control line, use single-point grounding at the power unit for the transmission line.
However, when supplying electric power to the M-NET centralized control line from the R410A series outdoor unit*1 without using a power supply unit for the transmission line, use single-point grounding at the TB7 of that outdoor unit. *1 Except PUMY.
- Furthermore, when connecting this device to the M-NET indoor control line, use grounding at the TB3 for each outdoor unit system.
- If the M-NET transmission line of this device is connected to the M-NET indoor control line and the outdoor unit is down because, for example, the power supply is interrupted for servicing or there is a failure, the DIDO controller cannot be controlled from the system controller.
- Controlling the system remote controller, ON/OFF remote controller, and schedule timer is only possible with channel 1 of a standard terminal block.
- DIDO controller can only be monitored or performed from AG-150 and TC-24 LCD, AG-150/GB-50ADA/GB-24 Web browser, and TG-2000.
- When AG-150/GB-50ADA/GB-24 is connected, monitoring control can only be performed from AG-150/GB-50ADA/GB-24 Web Browser or TG-2000. Monitoring control cannot be performed from the system remote controller (ON/OFF remote controller or schedule timer).

3. SYSTEM CONTROLLER

3-13-1. Specifications

3-13-1-2. Parts Purchased Separately

Prepare the following parts to install this device.

Required Part	Specification
Unit fixing screws	M4 screw × 4 (*M4: ISO metric screw thread)
Power supply for this device	Commercially available power source: 24 VDC±10% 0.2 A (Minimum loading), SELV circuit, power line with grounding terminal Ripple noise: Lower than 200 mVp-p Compatible specification Authorized or CE marked products Subject to regulations: - IEC60950 (or EN60950) - CISPR22/24 (or EN55022/24) - IEC61000-3-2/3-3 (or EN61000-3-2/3-3) When using transistor output (including extension output) for the 24 VDC output of this device, increase the capacity to match the number used. • 1 set used: 0.3 ADC (Minimum) • 2 sets used: 0.4 ADC (Minimum) • 3 sets used: 0.5 ADC (Minimum) • 4 sets used: 0.6 ADC (Minimum) • 5 sets used: 0.7 ADC (Minimum) • 6 sets used: 0.8 ADC (Minimum) * The increase of the power supply capacity is 0.1 ADC for every set.
Power line	Use a sheathed vinyl cord or cable. At least 0.75 mm ² (AWG18)
M-NET transmission line	Type of the cable: Sheathed vinyl cords or cable which comply with the following specifications or equivalent. • CPEV Ø1.2 mm to Ø1.6 mm • CVVS 1.25 mm² to 2 mm² (AWG 16) * CPEV: PE insulated PVC jacketed shielded communication cable * CVVS: PVC insulated PVC jacketed shielded control cable PE: Polyethylene PVC: Polyvinyl chloride Power needs to be supplied to the M-NET circuitry of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line.
Signal lines	Use electric wire of an appropriate size for the terminal block of this device. Electric wire size … (1) Solid wire: Ø0.65 mm (AWG21) - Ø1.2 mm (AWG16) (2) Stranded wire: 0.75 mm² (AWG18) - 1.25 mm² (AWG16) Single strand: At least Ø0.18 mm To use an expansion input/output, use a separately purchased external input/output adapter.

[Parts to be Purchased Separately]

Name	Model	Application	Remark
Power supply unit	PAC-SC51KUA	Power supply to the M-NET transmission line	This is not required when power is to be supplied from an outdoor unit.
External I/O adapter	PAC-YG10HA	Connection adapter for using an expansion input/output	This is required when an expansion input/output is used.

[Commercially available parts]

Name	Application	Remark
External 24 VDC power source	Supplies power when to use the DIDO controller or transistor output.	Refer to "Power supply for this device" in "Required Part" above for the power supply capacity.
Relay device	Requires commercially available relay device depending on the electric specifications with an external device.	

3. SYSTEM CONTROLLER

3-13-3. Interlock control

The DIDO controller (PAC-YG66DCA) has an interlock control function, which enables operation or set temperature change on the M-NET devices such as indoor units and also enables signal output to the contacts on the DIDO controller.

Interlock control covers the units connected to the DIDO controller with M-NET system. AG-150/GB-50ADA/GB-24/TC-24 must be connected to use the function. Ask your dealer for interlock control setting. The setting requires special tool support.



CAUTION

Before using the interlock control, you must agree to the following.

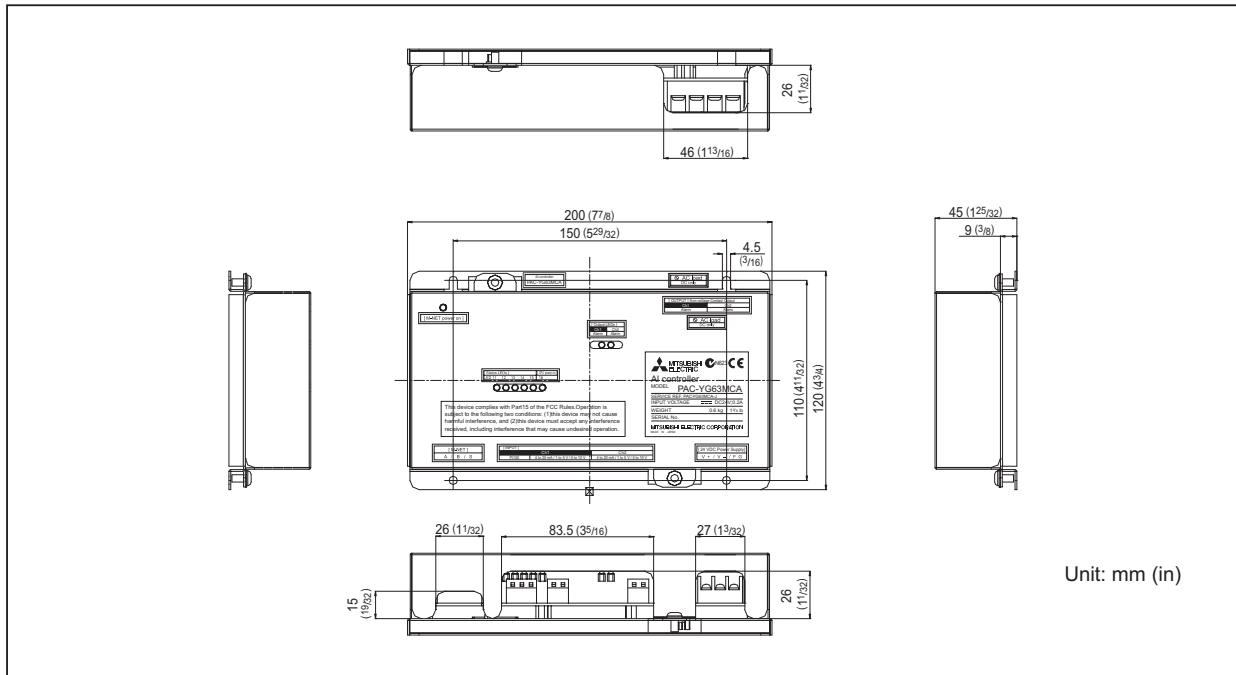
1. This feature must not be used for disaster prevention or security purpose.
(Not designed to be used in situations that are life-threatening)
2. No functions must be added that allow the malfunctioning unit to run by defeating the safety features, such as an external ON/OFF switch or a short-circuit.
3. Those settings for the function that are not supported by the interlocked units must not be made. All the settings must be made within the specified range.
(Failure to observe these precautions may result in malfunctions and failures.)
4. Perform a test run for interlock control, and confirm the correct settings and normal operation.
5. The system must be configured in the way that integrates the operation of the interlocked fire and emergency control systems.

Item	Content	Remarks
Number of events	24 events	1 event interlock with 1 unit
Determinant condition for interlock control	At input contact change	• Operation input ON/OFF • Error input Error/Normal
Interlock control contents (to be output)	1 action for 1 condition • ON/OFF operation of indoor units • Operation mode change of indoor units • Temperature setting of indoor units • Contact output to DIDO controller (*1)	Interlock control covers the units connected to DIDO controllers with M-NET system. (*1) DIDO controller itself or other DIDO controllers in the same M-NET system.
Other	Interlock control prohibition function is enabled at emergency stop from AG-150/GB-50ADA/GB-24	

3-14. AI controller [PAC-YG63MCA]

The AI controller measures temperature and humidity; it also has an alarm capability if the measurement data exceeds defined setpoints. Historical measurement data can be displayed via only the AG-150/GB-50ADA Web browser and TG-2000. Temperature and humidity cannot be displayed on the AG-150 LCD. Furthermore, an alarm can be output if measurement data exceeds a preset upper or lower limit. The AI controller also features a function that interlocks M-NET devices for indoor units, etc.

■ External Dimensions



⚠ CAUTION

Usage Restrictions

- Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predicable or unpredictable); and secondary or accidental damages, and damages to other objects. We also do not take financial responsibility for opportunities lost as a result of device failure, or electrical power failure at the end-user site.
- Mitsubishi Electric does not take financial responsibility caused by end-users' requests including, but not limited to, device testing, startup, readjustment and replacement.
- Do not use this device in disaster prevention security or "critical to life" applications.

3. SYSTEM CONTROLLER

3-14-1. Specifications

3-14-1-1. Device Specifications

Item	Description							
Power Supply	24 VDC ±10%: 5 W						Screw terminal block (M3) (*5)	
Interface	M-NET communication			17 to 30 VDC (*1)			Screw terminal block (M3) (*5)	
	Input (*2)	Ch	Sensor	Measurement target	Measurement range	Measurement error	External connection method	
		Ch1	Pt100 (3-wire system)	Temperature	-30 to 60°C [-22 to 140°F]	± 0.3%FS ± 0.1°C (0.18°F) (*3) [at 25°C(77°F)]	Screwless terminal block (3 poles)	
			Analog	4 to 20 mADC	Temperature/humidity	(Set by system controller)	± 0.5%FS ± 0.1°C (0.18°F) (*3) ± 0.5%FS ± 0.1%RH [at 25°C(77°F)]	Screwless terminal block (2 poles)
				1 to 5 VDC				
		0 to 10 VDC						
		Ch2	4 to 20 mADC	Temperature/humidity	(Set by system controller)	± 0.5%FS ± 0.1°C (0.18°F) (*3) ± 0.5%FS ± 0.1%RH [at 25°C(77°F)]	Screwless terminal block (2 poles)	
			1 to 5 VDC					
			0 to 10 VDC					
		Output	Upper/lower limit alarm interlock output (non-voltage contact)		Applied load MAX: 24 VDC, 5 W MIN: 5 VDC, 2 mW * AC loads cannot be connected.			Screw terminal block (M3.5) (*5)
Interlock Function	Interlock M-NET devices according to measurement data values. (*4)							
Environment Conditions	Temperature			Operating temperature range		0 to 40°C [32°F to 104°F]		
				Storage temperature range		-20 to 60°C [-4°F to 140°F]		
	Humidity			30 to 90%RH (no condensation)				
Dimensions	200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 1 25/32 (D) in							
Weight	0.6 kg / 1 3/8 lb							
Time Backup During Power Failure	In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)							
Installation Environment	Inside a control panel (indoors) * Use this product in a hotel, a business office environment or similar environment.							

*1: Supply electric power from a power supply unit for the transmission line or an outdoor unit. Furthermore, the power consumption factor of the MNET circuitry of this unit is "1/4" (equivalent to one ME Remote Controller).

*2: Configure the dip switch settings for the analog input method to use.

*3: The measurement error for the system includes the measurement error for this unit, sensor, and wiring.

$a\%FS$ (full scale) = $a\% \times ([\text{measurement range's upper limit value}] - [\text{lower limit value}])$

*4: Settings for the interlock function are performed from the Maintenance Tool. For details, refer to the operation manual for the Maintenance Tool.

*5: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread). The number indicates the screw diameter (mm).

3. SYSTEM CONTROLLER

3-14-1. Specifications

3-14-1-2. Parts Purchased Separately

Prepare the following parts to install this device.

Required Part	Specification
Unit fixing screws	M4 screw × 4 (* M4: ISO metric screw thread)
Power supply for this device	Commercially available power source: 24 VDC ± 10% 0.2 A (Minimum loading), SELV circuit, power line with grounding terminal Ripple noise: Lower than 200 mVp-p Compatible specification Authorized or CE marked products. Subject to regulations: - IEC60950 (or EN60950) - CISPR22/24 (or EN55022/24) - IEC61000-3-2/3-3 (or EN61000-3-2/3-3)
Power supply for sensors	A separate power supply for sensors may be required. In the case of 24 VDC voltage, the capacity of the power supply for this unit can be increased so that the power supply can be shared.
Power line	Use a sheathed vinyl cord or cable. At least 0.75 mm ² (AWG18)
M-NET transmission line	Type of the cable: Sheathed vinyl cords or cable which comply with the following specifications or equivalent. • CPEV ø 1.2 mm to ø 1.6 mm • CVVS 1.25 mm ² to 2 mm ² (AWG 16) * CPEV: PE insulated PVC jacketed shielded communication cable * CVVS: PVC insulated PVC jacketed shielded control cable PE: Polyethylene PVC: Polyvinyl chloride Power needs to be supplied to the M-NET circuitry of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line.
Signal lines (Sensor input lines)	Shows the size of the electric wire (copper wire) that is adapted to the terminal block of this device. Refer to the usage and cautionary items of the sensor when performing settings. However, use a line with shielded line. Electric wire size … (1) Solid wire: ø 0.65 mm (AWG21) - ø 1.2 mm (AWG16) (2) Stranded wire: 0.75 mm ² (AWG18) - 1.25 mm ² (AWG16) Single strand: At least ø 0.18 mm

[Parts to be Purchased Separately]

Name	Model	Application	Remark
Power supply unit	PAC-SC51KUA	Power supply to the M-NET transmission line	This is not required when power is to be supplied from an outdoor unit.

[Commercially available parts]

Part	Use	Remark
External 24 VDC power source	Supplies power to the AI controller.	Refer to "Power supply for this device" and "Power supply for sensors" in "Required Part" above for the capacity of the power supply.
Sensor	Measures temperature and humidity.	Temperature sensor (PAC-SE40TSA) cannot be connected.

3-14-2. Interlock control

AI controller (PAC-YG63MCA) has an interlock control function, which enables operation or set temperature change on the M-NET devices such as indoor units.

Interlock control covers the units connected to the AI controller with M-NET system. AG-150/GB-50ADA/GB-24 must be connected to use the function. Ask your dealer for interlock control setting. The setting requires special tool support.

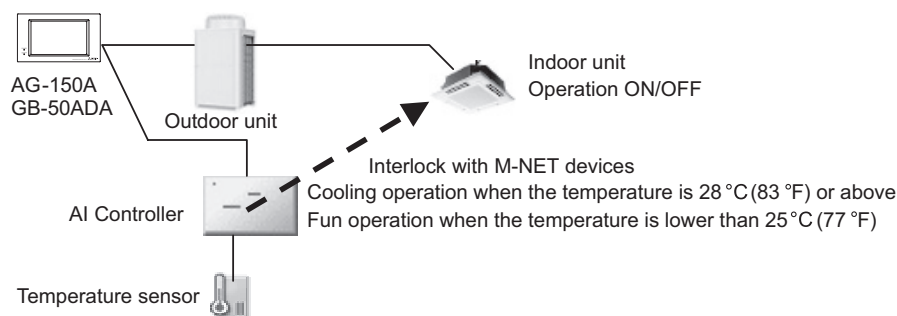


CAUTION

Before using the interlock control, you must agree to the following.

- 1.This feature must not be used for disaster prevention or security purpose.
(Not designed to be used in situations that are life-threatening)
- 2.No functions must be added that allow the malfunctioning unit to run by defeating the safety features, such as an external ON/OFF switch or a short-circuit.
- 3.Those settings for the function that are not supported by the interlocked units must not be made. All the settings must be made within the specified range.
(Failure to observe these precautions may result in malfunctions and failures.)
- 4.Perform a test run for interlock control, and confirm the correct settings and normal operation.
- 5.The system must be configured in the way that integrates the operation of the interlocked fire and emergency control systems.

Item	Content	Remarks
Number of events	24 events	1 event interlock with 1 unit
Determinant condition for interlock control	Measurement value Measurement interval is 1 to 7200 seconds.	- Exceeding measurement value in setting range - Exceeding upper/lower limit alarm detection value and cancellation value
Interlock control contents (to be output)	1 action for 1 condition - ON/OFF operation of indoor units - Operation mode change of indoor units - Temperature setting of indoor units - Contact output to DIDO controller	Interlock control covers the units connected to AI controllers with M-NET system.
Other	Interlock control prohibition function is enabled at emergency stop from AG-150/GB-50ADA/GB-24	



Interlock control of AI controller (example)

3. SYSTEM CONTROLLER

3-15. Transmission booster [PAC-SF46EPA]

The Outdoor unit supplies transmission power 30VDC for the indoor-outdoor transmission line at its connector TB3 and TB7. The power is consumed by the Indoor unit, ME remote controller, Timers and System controllers. When the total quantity of Indoor units, and ME remote controller, Timers and System controllers is over 40, or when transmission power supply is not enough, the transmission booster PAC-SF46EPA should be designed into the air-conditioner system to ensure the system communication. Indoor unit sized P72, 96 is counted as 2 units.

3-15-1. Designing PAC-SF46EPA into an air-conditioner system.

Taking the power consumption of Indoor unit sized P06-P54 as 1, the equivalent power consumption or supply of others are listed at Table 3-15-1 and Table 3-15-2.

Table 3-15-1 The equivalent power consumption by Indoor units, LOSSNAY, controllers

Indoor	Indoor unit	BC controller	MA RC. LOSSNAY	ME Remote Contr.	Timers, System Contr.			ON/OFF Contr.
Sized P06-P54	Sized P72-P96	CMB	PAR-21MAA PAC-YT51CRB PAR-FA32MA LGH-RX-E	PAR-F27MEA-US PZ-52SF	PAC-SF44SRA PAC-YT34STA AG-150	TC-24	GB-24	PAC-YT40ANRA
1	2	2	0	1/4	1/2	4	3	1

*RC : Remote Controller

Table 3-15-2 The equivalent power supply of Trans. Booster, Power supply unit, Connector TB3, TB7 of Outdoor unit.

Transmission Booster	Power supply unit	BM Adapter	System Controller	Outdoor unit	Outdoor unit
PAC-SF46EPA	PAC-SC51KUA	BAC-HD150	GB-50ADA	Connector TB3 and TB7 total *	Connector TB7 only
25	5	6	6	32	6

*If PAC-SC51KUA is used to supply power at TB7 side, no power supply need from Outdoor unit at TB7, Connector TB3 itself will therefore have 32.

Transmission booster PAC-SF46EPA has equivalent transmission power 25.

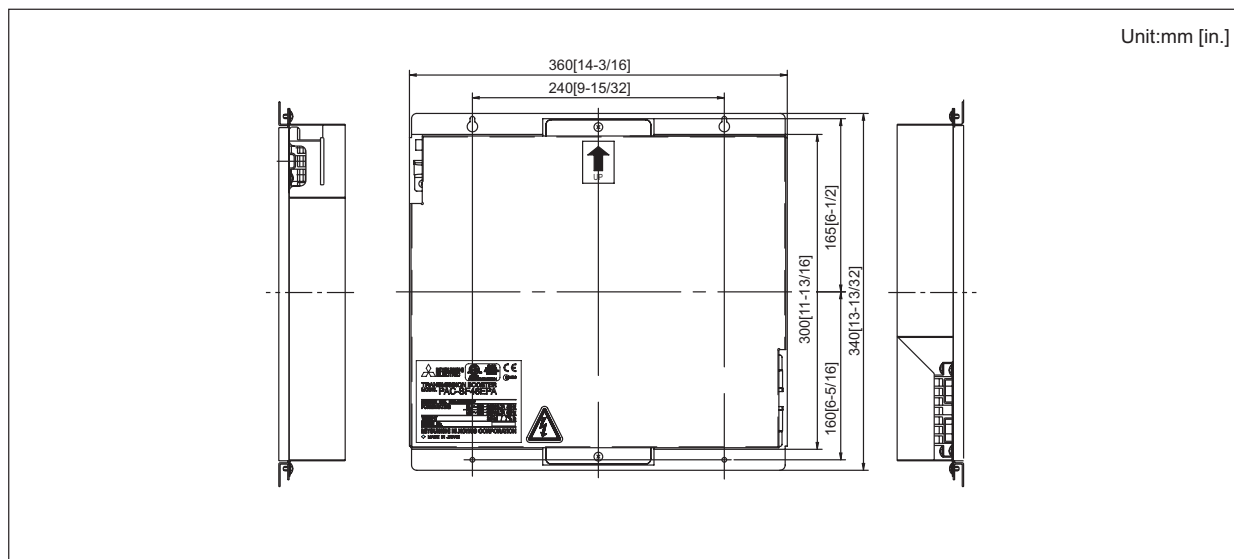
With the equivalent power consumption values in Table 3-15-1 and Table 3-15-2, PAC-SF46EPA can be designed into the air-conditioner system to ensure proper system communication according to A, B, C.

3-15-1-A) Firstly, count from TB3 at TB3 side the total quantity of Indoor units and ME remote controller, Timers and System controllers. If the total quantity reaches 40, a PAC-SF46EPA should be set. In this case, Indoor unit sized P72, 96 is counted as 2 Indoor units, but MA remote controller(s), LOSSNAY is NOT counted.

3-15-1-B) Secondly, count from TB7 side to TB3 side the total transmission power consumption. If the total power consumption reaches 32, a PAC-SF46EPA should be set. Yet, if a PAC-SC51KUA is used to supply power at TB7 side, count from TB3 side only.

3-15-1-C) Thirdly, count from TB7 at TB7 side the total transmission power consumption, If the total power consumption reaches 6, a PAC-SF46EPA should be set.

■ External dimension



4. SYSTEM COMPONENT

In a multi air conditioner system that is a free plan direct-expansion type, a connector for inputting and outputting signals to/from the outside is fitted as standard on the control board of the indoor and outdoor units. Use this when you want each unit to input/output signals individually. (Note: When there are many control units it is recommended that you use MELANS. This would enable you to save on labor.) In order to have an input output signal from each connector, you must have a dedicated adapter (sold separately) and a relay circuit (on-site arrangements).

Note : See next page for actual examples of use.

- Types of control that uses connectors for the outdoor unit / water-source unit input output signal (connection for each type of option).

Category	Application	Function	Connector	
			Y, WY	R2, WR2
Input	Method of disabling cool and heat operation (thermo off) by input from the outside to the outdoor unit.	Comp ON/OFF	CN3D	CN3D
	The low noise operation of the indoor unit can be commenced by the external input to the outdoor unit (water-source unit). (The night mode can be adapted only under the outdoor temperature condition of 30°C [87°F] or less for cooling and 3°C [37°F] or more for heating)	Night mode	CN3D	CN3D
	You can switch the operation mode between cooling and heating by input from the outside to the outdoor unit.	Autochangeover	CN3N	—
	Forces the heat source unit to stop operation by receiving contact signals from the pump interlock circuit	Pump Interlock signal input (level)	TB8 (W-Series)	TB8 (W-Series)
	Forces outdoor unit to perform a fan operation by receiving signals from the snow sensor. (note 10)	Snow sensor signal input	CN3S (Y-Series)	CN3S (R2-Series)
Output	Method of receiving a signal from the outdoor unit (water-source unit) to the outside. * Can be used as a device that displays the operation state. * Can be used as an interlocked control with external equipment.	Compressor is run state	CN51	CN51
		Error state or frost prevention output (note 8)		
		Operation ON signal (note 9)	TB8	TB8

- Types of control that uses connectors for the indoor unit input output signal (connection for each type of option)

Category	Application	Function	Connector
Input (Note 2,3)	Method of ON/OFF control by turning on and off switches or contacts from an outside to each indoor unit group. Can be used as a timer adapter (Note 1) Can be used as a "forget to switch off prevention" or "forced stop".	Distant/local switching (note 1)	CN32
		ON/OFF (level)	
	Method of ON/OFF control by inverting start/stop using external pulse (a-contact) for each indoor unit group.	ON/OFF (pulse)	CN51
Output	Method of sending signals to outside for each indoor unit group. It can be used as a device to display operation states. It can be used as an interlocked control with the external equipment.	Operation state	CN51
		Error state	
		Operation mode (heat) state	CN52
		Operation mode (cool, dry) state	
		Thermo ON (fan) state	

4. SYSTEM COMPONENT

Note 1: Connect the signal input only to the principal unit in a group.

(However, the demand input is required to enter into indoor units individually.)

Note 2: When using start/stop input at group operation, Local remote controller is necessary.

(MA remote controller or M-NET remote controller)

Note 3: When setting to Remote, operation can not be performed from Local remote controller.

The remote controller displays [CENTRAL] / [CENTRALLY CONTROLLED] / .

Note 4: When using start/stop input at group operation, [Automatic address start-up] can not be performed.

Note 5: When CN51 or CN52 is commonly used as an output signal, be sure to use the remote display kit.

Note 6: The remote display kit can be used for the input signal of CN51 and CN52.

Note 7: Connect to the principal unit only when using [Operating status] or [Operation mode (Heating/Cooling-Dry) of signal output. Connect to indoor units individually when using [Error status] or [Thermostat ON (or fan) status]

Note 8: The error state of the heat source unit can be output when Dip SW3-3 is OFF.

When Dip SW3-3 is ON, the signal is output only when the heat source unit is stopped and the water temperature (TH6) is 5°C[41°F] or lower.

Note 9: When Dip SW2-7 is OFF, the operation ON signal is output only when the compressor is in operation.

When Dip SW2-7 is ON, the signal is output when cooling or heating operation signal from the controller is received. (The signal is kept active even if the compressor stops due to thermo OFF.)

Note 10: When multiple outdoor units exist in one refrigerant circuit, settings on every outdoor unit (signal input) are required.

4. SYSTEM COMPONENT

It is possible to have ON/OFF control by turning the indoor unit power on and off. You can select functions by setting the DipSW1-9 and 1-10 on the indoor unit.

■ Types of ON/OFF control (indoor unit settings)

It is possible to have ON/OFF control for each indoor unit (or group) by dip switches 9 and 10 (SW1-9, SW1-10) of the indoor unit.

Function	Operation when indoor unit recovers	Setting SW 2 (note 1)	
		9	10
All auto restart	All indoor units will always restart regardless of the state that was before the power was turned off (POWER OFF) (after 5 minutes).	OFF	ON
Auto recovery	Indoor units which are operated before the power was turned off (POWER OFF) will restart (after 5 minutes).	ON	OFF
All OFF	Operation stays stopped regardless of the state that was before the power was turned off.	OFF	OFF

Note 1. The dip switch setting for all units in the indoor unit group is required.

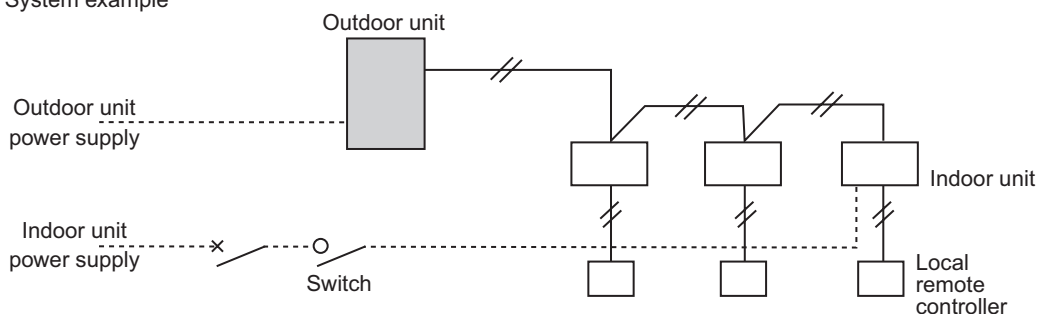
Note 2. Do not cut-off the power to the outdoor unit. If you do, it will disconnect the power to the crank-case heater of the outdoor unit and that could cause damage to the compressor.

Note 3. This cannot be applied to the power ON/OFF of the drain pump and humidifier equipment.

■ Description of when using distant/local switching (CN32)

SW1 Local switching	SW2 ON/OFF	State	Remote controller display/operation
OFF	OFF	Local / Permit	The operation permit
ON	OFF	Distant / Stop	It displays "CENTRALLY CONTROLLED", while the state is distant.
ON	ON	Distant / Operate	It prohibits ON/OFF operation of remote controller.

■ System example



When the power to the outdoor unit is cut-off for a long time, the crankcase heater for the compressor also stops. If the compressor is started soon after the power is restored, there is a chance that a fault will occur in the compressor. When using the above function, make sure the power to the outdoor units will not be cut-off.

■ Limitations to combining system controls

	Description		Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	—	× *1	× *1	× *1
2	Pulse ON/OFF	CN51		—	○	○
3	HA ON/OFF (JEMA)	CN51			○	○
4	Power ON/OFF	-			—	×
5	Automatic recover	-				—

*1: Pulse ON/OFF, Power ON/OFF and automatic recover can only be used when the distant/local setting (CN32) is set to local. Therefore, always avoid this function when combining control.

4. SYSTEM COMPONENT

4-1. Y-, R2-, H2i®, S-Series

CITY MULTI system can be monitored or controlled with signal to/from the outside as every control board of Indoor unit or Outdoor unit has input/output signal connectors. Independent control to the individual Indoor or Outdoor can be carried out by using these connectors. Yet, for large-scale control, MELANS would be much easier. When using input/output connectors, a dedicated adapter (optional part) and a relay circuit needed to be prepared by the site.

Following are some typical example.

Table 4-1. Control can be achieved by using Outdoor input/output connectors.

Function	Usage	Using connector		Signal	Option
		PUHY	PURY		
Demand	Prohibiting cooling/heating operation (thermo OFF) by an external input to the outdoor unit. * It can be used as the demand control for each refrigerant system.	CN3D	CN3D	Input (level-signal)	Adapter for external input (PAC-715AD)
Low noise mode	Performs a low noise operation of the outdoor unit by an external input to the outdoor unit. * It can be used as the low noise operation device for each refrigerant system.				
Snow sensor signal input	Forces the outdoor unit to perform a fan operation by receiving signals from the snow sensor. *4	CN3S	CN3S	Output (level-signal)	Adapter for external output (PAC-725AD)
System changeover	Cooling/heating operation can be changed by an external input to the outdoor unit.	CN3N	-		
Operation status of the compressor	How to extract signals from the outdoor unit. * It can be used as an operation status display device.	CN51	CN51		
Error status	* It can be used for an interlock operation with external devices.				

*1 For details, refer to 1) through 4) shown below.

*2 Low noise mode is valid when Dip SW4-4 on the outdoor unit is set to OFF. When DIP SW4-4 is set to ON, 4 levels of on-DEMAND are possible, using different configurations of low noise mode input and DEMAND input settings.

When 2 or more outdoor units exist in one refrigerant circuit system, 8 levels of on-DEMAND are possible. When 3 outdoor units exist in one refrigerant circuit system, 12 levels of on-DEMAND are possible.

*3 Low noise mode can be switched from ability main to low noise main with Dip SW5-5 on the outdoor unit. Dip SW5-5 OFF: ability main (ability main mode : The sound pressure level is reduced by limiting the maximum fan frequency under the following condition. Cooling mode : outdoor temp. (TH6) < 30°C Heating mode : outdoor temp. (TH6) > 3°C), ON: low noise main.

*4 When multiple outdoor units exist in one refrigerant circuit system, settings on every outdoor unit (signal input) are required.

*5 For detailed drawing, refer to "4-2. Outdoor unit input/output connector".

1) Table 4-1-1 SW4-4: OFF (Compressor ON/OFF, Low noise mode)

CN3D 1-3P	2-level of on-Demand *6
Open	100%(No Demand)
Short-circuit	0%
CN3D 1-2P	Low noise mode *7
Open	OFF
Short-circuit	ON

*6 When SW4-4 on the outdoor unit in one refrigerant circuit system is set to ON (4 levels or 8 levels or 12 levels of on-DEMAND), this function cannot be used.

*7 This function and the 4 levels or 8 levels on-DEMAND function can be used together. Input the order to CN3D 1-2P on the outdoor unit whose SW4-4 is set to OFF.

2) When SW4-4 on one outdoor unit in one refrigerant circuit system is set to ON (4 levels of on-DEMAND) (*8)

	CN3D 1-2P	
CN3D 1-3P	Open	Short-circuit
Open	100% (No DEMAND)	75%
Short-circuit	0%	50%

Note the following steps to be taken when using STEP DEMAND.

Example: When switching from 100% to 50%

Steps in DEMAND level setting	<WRONG>	100%	→	10%	→	50%
	<CORRECT>	100%	→	75%	→	50%

If the demand settings are switched in the wrong order listed as the wrong example above, the unit may go into thermo OFF mode.

The percentage of the DEMAND listed in the table above is an approximate value based on the compressor volume and does not necessarily correspond with the capacity.

This function and the Low noise mode function cannot be used together.

3) When SW4-4 on the two outdoor units in one refrigerant circuit system is set to ON (8 levels of on-DEMAND) (*8,*9)

8 levels of on-DEMAND		No.2 CN3D					
No.1 CN3D	1-2P	1-2P	Open		Short-circuit		
		1-3P	Open	Short-circuit	Open	Short-circuit	
	Open	Open	100% (No DEMAND)	50%	88%	75%	
	Short-circuit	Short-circuit	50%	0%	38%	25%	
	Short-circuit	Open	88%	38%	75%	63%	
		Short-circuit	75%	25%	63%	50%	

4) When SW4-4 on the all outdoor units in one refrigerant circuit system is set to ON (12 levels of on-DEMAND) (*9)

12 levels of on-DEMAND	No.2 CN3D	1-2P	Open							
		1-3P	Open				Short-circuit			
	No.3 CN3D	1-2P	Open		Short-circuit		Open		Short-circuit	
No.1 CN3D	1-2P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit
	Open	Open	100%	67%	92%	84%	67%	34%	59%	50%
		Short-circuit	67%	34%	59%	50%	34%	0%	25%	17%
	Short-circuit	Open	92%	59%	84%	75%	59%	25%	50%	42%
		Short-circuit	84%	50%	75%	67%	50%	17%	42%	34%
12 levels of on-DEMAND	No.2 CN3D	1-2P	Short-circuit							
		1-3P	Open				Short-circuit			
	No.3 CN3D	1-2P	Open		Short-circuit		Open		Short-circuit	
No.1 CN3D	1-2P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit
	Open	Open	92%	59%	84%	75%	84%	50%	75%	67%
		Short-circuit	59%	25%	50%	42%	50%	17%	42%	34%
	Short-circuit	Open	84%	50%	75%	67%	75%	42%	67%	59%
		Short-circuit	75%	42%	67%	59%	67%	34%	59%	50%

*8 Input the order to CN3D on the outdoor unit whose SW4-4 is set to ON.

*9 CN3D of No. 1, 2, 3 can be selected arbitrary with the outdoor unit whose SW4-4 is set to ON.

4. SYSTEM COMPONENT

Table 4-2. Control can be achieved by using Indoor input/output connectors.

Function	Usage	Using connector	Signal
Remote/Local switching *1 ON/OFF *2*3	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of the head Indoor in an Indoor group. It can be interlocked with timer, door, window, or other equipment to "Force stopping"	CN32	Input (level-signal)
ON/OFF *2*3	Indoor group can be controlled ON/OFF by an external pulse signal input to the connector of the head Indoor in an Indoor group.	CN51	Input (pulse-signal)
Demand	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of every Indoor in an Indoor group.	CN52	Input (pulse-signal)
Monitoring ON/OFF state	Signal output from a head Indoor unit, presenting its Indoor group.	CN51	Output
Monitoring heating state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	
Monitoring cooling/drying state		CN52	
Monitoring Error state	Signal output from every Indoor unit, for monitoring Error or Thermo-off (fan) state.	CN51	Output
Monitoring Thermo-OFF(fan) state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	

*1. When switching to Remote, control at Local remote controller will NOT be effective, but the "CENTRALLY CONTROLLED" is displayed.

*2. MA or ME remote controller is needed for this function.

*3. If using ON/OFF input function, Automatic-address-start-up can not be performed to start-up the system at commissioning.

*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-2 are no more available.

Details are available at the PLC software Instruction Manual.

Table 4-3. ON/OFF control to each Indoor unit (group) by using Dip Switch 9 and 10 (SW1-9, SW1-10) of the Indoor unit.

Function	Operation on Indoor units	Setting Dip Switch *1*4	
		1-9	1-10
Auto ON	All indoor units will turn ON and automatically resume to its previous mode after 5 minutes from power recovery.	OFF	ON
Auto recovery	Indoor unit recovers to its previous state (ON/OFF, mode) after 5 minutes from power recovery.	ON	OFF
All OFF	Forced stopping regardless of Indoor units' state.	OFF	OFF

*1. The Dip Switch setting should be carried out on every Indoor unit in the group.

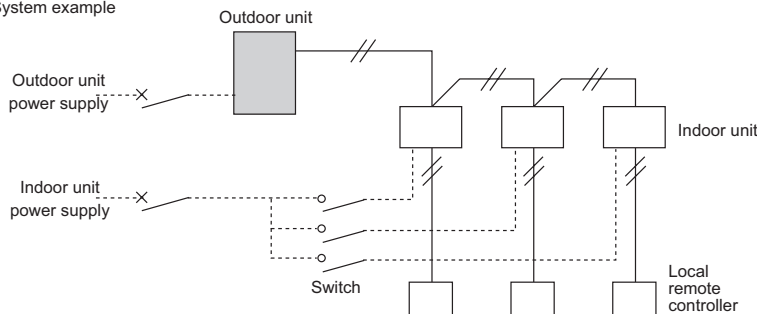
*2. Outdoor unit's power supply should NOT be cut. Otherwise, power supply to case heater of the compressor would be cut too, which may cause damage to the compressor.

*3. Above method can not be applied to the power ON/OFF of the drain pump and humidifier equipment.

*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-3 are no more available.

System example



Restart of the CITY MULTI needs to be careful. When no power supply to the outdoor unit, no power supply to the compressor case heater too. The compressor needed to be warmed up before running. When using above functions, power supply to the outdoor unit should be ensured.

Table 4-4. How to use Remote/Local switching connector CN32

State	Local remote controller display and operation	CN32-SW-1 for Local/Remote control switching	CN32-SW-2 for Remote "ON/OFF" operation
Local remote controller control	Operation is permitted	OFF	OFF
Remote STOP	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	OFF
Remote START	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	ON

* For details refer to CN32 in section "4-5. Indoor unit "-E" type input/output connector".

Table 4-5. Limitations to combining system controls

	Description	Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	-	X*1	X*1
2	Pulse ON/OFF	CN51	-	O	O
3	HA ON/OFF (JEMA)	CN51		O	O
4	Power ON/OFF	-		-	X
5	Automatic recover	-			-

*1. Pulse ON/OFF, power ON/OFF and automatic recover can only be used when the remote/local setting CN32 is set to local.
Therefore, always avoid this function when combining control.

4. SYSTEM COMPONENT

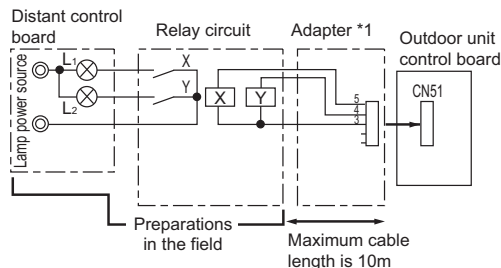
4-2. Outdoor unit input/output connector (Y-, R2-, S-Series)


Caution:

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750V or more.

4-2-1. Output

- State (CN51)



L1 : Outdoor unit error display lamp
 L2 : Compressor operation lamp (compressor running state)
 X, Y : Relay (coil $\leq 0.9W$: 12VDC)

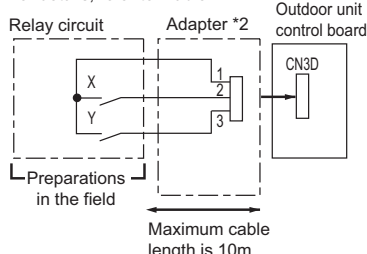
*1. Optional part : PAC-725AD or field supply.

4-2-2. Input

Y, H2i, R2 series

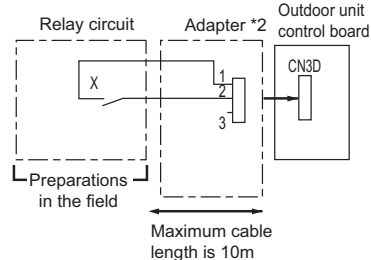
- (1) Step demand and Low noise mode (CN3D)

For details, refer to "Table 4-1-1".



X : Low noise mode or demand
 Y : Demand
 X, Y : Relay Contact rating voltage $\geq 15VDC$
 Contact rating current $\geq 0.1A$
 Minimum applicable load $\leq 1mA$ at DC
 *2. Optional part : PAC-715AD or field supply.

- (2) Low noise mode (CN3D + DipSW4-4 OFF)



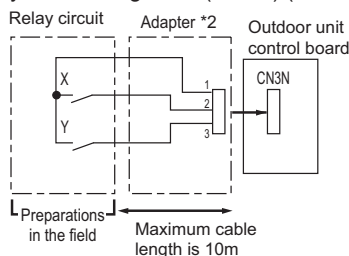
X : Relay Contact rating voltage $\geq 15VDC$
 Contact rating current $\geq 0.1A$
 Minimum applicable load $\leq 1mA$ at DC
 *2. Optional part : PAC-715AD or field supply.

Low noise mode : The sound pressure level is reduced by controlling the maximum fan frequency and compressor frequency.

-Note-

The sound pressure level can not be reduced, when neither the fan frequency nor the compressor frequency are maximum.

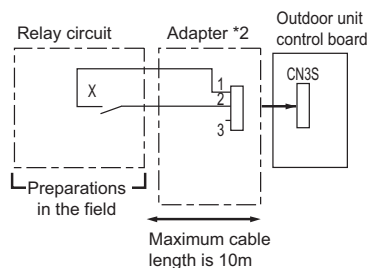
- (3) System Changeover (CN3N) (R2 excluded)



X : Cooling / Heating
 Y : Validity / Invalidity of X
 X, Y : Relay Contact rating voltage $\geq 15VDC$
 Contact rating current $\geq 0.1A$
 Minimum applicable load $\leq 1mA$ at DC
 *2. Optional part : PAC-715AD or field supply.

		X	
		OFF	ON
Y	OFF	Normal	
	ON	Cooling	Heating

- (4) Snow sensor (CN3S)

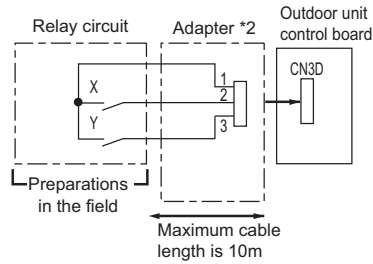


X : Relay Contact rating voltage $\geq 15VDC$
 Contact rating current $\geq 0.1A$
 Minimum applicable load $\leq 1mA$ at DC

*2. Optional part : PAC-715AD or field supply.
 Snow sensor : The outdoor fan runs when X is closed in stop mode or thermostat mode.

S-Series

(1) Step demand and Silent mode (Night mode) (CN3D)



X, Y : Relay Contact rating voltage $\geq 15\text{VDC}$
 Contact rating current $\geq 0.1\text{A}$
 Minimum applicable load $\leq 1\text{mA}$ at DC

*2. Optional part : PAC715AD or field supply.
 DipSW8-1 ON (Step demand only)

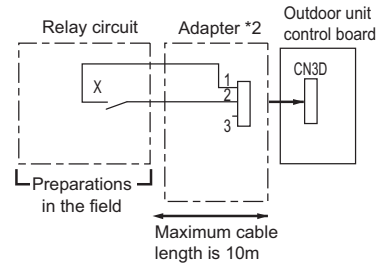
		X	
		OFF	ON
Y	OFF	100%	75%
	ON	0%	50%

*They are rough values.

DipSW8-1 OFF (Compressor ON/OFF and Silent mode (Night mode))

Y	Compressor ON/OFF	X	Low noise mode
OPEN	ON	OPEN	OFF
SHORT	OFF	SHORT	ON

(2) Silent mode (Night mode) (CN3D + DipSW8-1 OFF)



X : Relay Contact rating voltage $\geq 15\text{VDC}$
 Contact rating current $\geq 0.1\text{A}$
 Minimum applicable load $\leq 1\text{mA}$ at DC

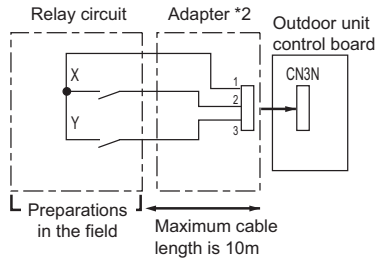
*2. Optional part : PAC-715AD or field supply.

Silent mode : The sound pressure level is reduced by controlling (Night mode) the maximum fan frequency and compressor frequency.

-Note-

The sound pressure level cannot be reduced, when neither the fan frequency nor the compressor frequency are maximum.

(3) System changeover (CN3N)



SW1 : Cooling / Heating

SW2 : Validity / Invalidity of X

X, Y : Relay Contact rating voltage $\geq 15\text{VDC}$
 Contact rating current $\geq 0.1\text{A}$
 Minimum applicable load $\leq 1\text{mA}$ at DC

*2. Optional part : PAC-715AD or field supply.

		X	
		OFF	ON
Y	OFF	Normal	
	ON	Cooling	Heating

4. SYSTEM COMPONENT

4-3. WY, WR2-Series

CITY MULTI system can be monitored or controlled with signal to/from the outside as every control board of Indoor unit or water source unit has input/output signal connectors. Independent control to the individual Indoor or water source can be carried out by using these connectors. Yet, for large-scale control, MELANS would be much easier. When using input/output connectors, a dedicated adapter (optional part) and a relay circuit needed to be prepared by the site.

Following are some typical example.

Table 4-1. Control can be achieved by using water source input/output connectors.

Function	Usage	Using connector		Signal	Option
		PQHY	PQRY		
Demand	Prohibiting cooling/heating operation (thermo OFF) by an external input to the water source unit. * It can be used as the demand control for each refrigerant system.	CN3D	CN3D	Input (level-signal)	Adapter for external input (PAC-715AD)
Low noise mode	Performs a low noise operation of the water source unit via external input to the water source unit. * It can be used as the low noise operation device for each refrigerant system.				
Pump Interlock signal input	Forces the water source unit to stop operation by receiving contact signals from the pump interlock circuit	TB8	TB8		
System changeover	Cooling/heating operation can be changed by an external input to water source unit.	CN3N	-		Adapter for external output (PAC-715AD)
Operation status of the compressor	How to extract signals from the water source unit. * It can be used as an operation status display device.	CN51	CN51	Output (level-signal)	
Error status	* It can be used for an interlock operation with external devices.				
Operation ON signal		TB8	TB8		

*1 For details, refer to 1) through 4) shown below.

*2 Low noise mode is valid when Dip SW4-4 on the water source unit is set to OFF. When DIP SW4-4 is set to ON, 4 levels of on-DEMAND are possible, using different configurations of low noise mode input and DEMAND input settings.

When 2 or more heat source units exist in one refrigerant circuit system, 8 levels of on-DEMAND are possible. When 3 water source units exist in one refrigerant circuit system, 12 levels of on-DEMAND are possible.

*3 For detailed drawing, refer to "4-4. water source unit input/output connector".

1) Table 4-1-1 SW4-4: OFF (Compressor ON/OFF, Low noise mode)

CN3D 1-3P	2-level of on-Demand *4
Open	100%(No Demand)
Short-circuit	0%
CN3D 1-2P	Low noise mode *5
Open	OFF
Short-circuit	ON

*4 When SW4-4 on the water source unit in one refrigerant circuit system is set to ON (4 levels or 8 levels or 12 levels of on- DEMAND), this function cannot be used.

*5 This function and the 4 levels or 8 levels on-DEMAND function can be used together. Input the order to CN3D 1-2P on the heat source unit whose SW4-4 is set to OFF.

2) When SW4-4 on one heat source unit in one refrigerant circuit system is set to ON (4 levels of on-DEMAND) (*6)

CN3D 1-2P		
CN3D 1-3P	Open	Short-circuit
Open	100% (No DEMAND)	75%
Short-circuit	0%	50%

Note the following steps to be taken when using STEP DEMAND.

Example: When switching from 100% to 50%

Steps in DEMAND level setting	<WRONG>	100% → 10% → 50%
	<CORRECT>	100% → 75% → 50%

If the demand settings are switched in the wrong order listed as the wrong example above, the unit may go into thermo OFF mode.

The percentage of the DEMAND listed in the table above is an approximate value based on the compressor volume and does not necessarily correspond with the capacity.

This function and the Low noise mode function cannot be used together.

3) When SW4-4 on the two water source units in one refrigerant circuit system is set to ON (8 levels of on-DEMAND) (*6,*7)

8 levels of on-DEMAND		No.2 CN3D					
No.1 CN3D	1-2P	1-3P	Open		Short-circuit		
	Open	Open	100% (No DEMAND)	50%	Open	Short-circuit	
		Short-circuit	50%	0%	38%	25%	
	Short-circuit	Open	88%	38%	75%	63%	
		Short-circuit	75%	25%	63%	50%	

4) When SW4-4 on the all water source units in one refrigerant circuit system is set to ON (12 levels of on-DEMAND) (*7)

12 levels of on-DEMAND	No.2 CN3D	1-2P	Open							
	No.3 CN3D	1-3P	Open				Short-circuit			
		1-2P	Open		Short-circuit		Open		Short-circuit	
	No.1 CN3D	1-2P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	
		Open	Open	100%	67%	92%	84%	67%	34%	50%
		Short-circuit	Open	67%	34%	59%	50%	34%	0%	25%
		Short-circuit	Short-circuit	92%	59%	84%	75%	59%	25%	50%
		Short-circuit	Short-circuit	84%	50%	75%	67%	50%	17%	42%
		Short-circuit	Short-circuit	75%	42%	67%	59%	67%	34%	50%

*6 Input the order to CN3D on the heat source unit whose SW4-4 is set to ON.

*7 CN3D of No. 1, 2, 3 can be selected arbitrary with the water source unit whose SW4-4 is set to ON.

4. SYSTEM COMPONENT

Table 4-2. Control can be achieved by using Indoor input/output connectors.

Function	Usage	Using connector	Signal
Remote/Local switching *1 ON/OFF *2*3	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of the head Indoor in an Indoor group. It can be interlocked with timer, door, window, or other equipment to "Force stopping"	CN32	Input (level-signal)
ON/OFF *2*3	Indoor group can be controlled ON/OFF by an external pulse signal input to the connector of the head Indoor in an Indoor group.	CN51	Input (pulse-signal)
Demand	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of every Indoor in an Indoor group.	CN52	Input (pulse-signal)
Monitoring ON/OFF state	Signal output from a head Indoor unit, presenting its Indoor group.	CN51	Output
Monitoring heating state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	
Monitoring cooling/drying state		CN52	
Monitoring Error state	Signal output from every Indoor unit, for monitoring Error or Thermo-off (fan) state.	CN51	Output
Monitoring Thermo-OFF(fan) state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	

*1. When switching to Remote, control at Local remote controller will NOT be effective, but the "CENTRALLY CONTROLLED" is displayed.

*2. MA or ME remote controller is needed for this function.

*3. If using ON/OFF input function, Automatic-address-start-up can not be performed to start-up the system at commissioning.

*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-2 are no more available.

Details are available at the PLC software Instruction Manual.

Table 4-3. ON/OFF control to each Indoor unit (group) by using Dip Switch 9 and 10 (SW1-9, SW1-10) of the Indoor unit.

Function	Operation on Indoor units	Setting Dip Switch *1*4	
		1-9	1-10
Auto ON	All indoor units will turn ON and automatically resume to its previous mode after 5 minutes from power recovery.	OFF	ON
Auto recovery	Indoor unit recovers to its previous state (ON/OFF, mode) after 5 minutes from power recovery.	ON	OFF
All OFF	Forced stopping regardless of Indoor units' state.	OFF	OFF

*1. The Dip Switch setting should be carried out on every Indoor unit in the group.

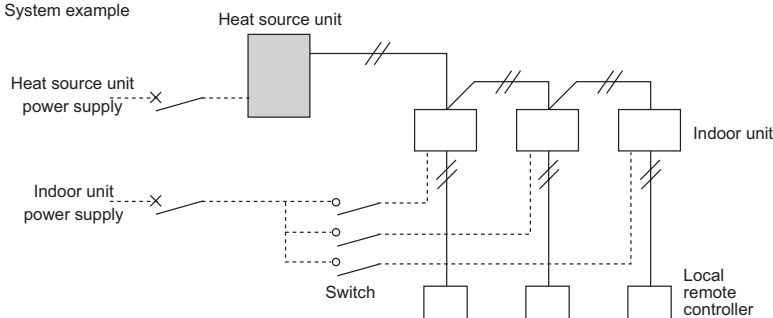
*2. Heat source unit's power supply should NOT be cut. Otherwise, power supply to case heater of the compressor would be cut too, which may cause damage to the compressor.

*3. Above method can not be applied to the power ON/OFF of the drain pump and humidifier equipment.

*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-3 are no more available.

System example



Restart of the CITY MULTI needs to be careful. When no power supply to the heat source unit, no power supply to the compressor case heater too. The compressor needed to be warmed up before running. When using above functions, power supply to the heat source unit should be ensured.

Table 4-4. How to use Remote/Local switching connector CN32

State	Local remote controller display and operation	CN32-SW-1 for Local/Remote control switching	CN32-SW-2 for Remote "ON/OFF" operation
Local remote controller control	Operation is permitted	OFF	OFF
Remote STOP	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	OFF
Remote START	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	ON

* For details refer to CN32 in section "4-5. Indoor unit "E" type input/output connector".

Table 4-5. Limitations to combining system controls

	Description	Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	-	X*1	X*1
2	Pulse ON/OFF	CN51	-	O	O
3	HA ON/OFF(JEMA)	CN51		O	O
4	Power ON/OFF	-		-	X
5	Automatic recover	-			-

*1. Pulse ON/OFF, power ON/OFF and automatic recover can only be used when the remote/local setting CN32 is set to local.

Therefore, always avoid this function when combining control.

4. SYSTEM COMPONENT

4-4. Water-source input/output connector

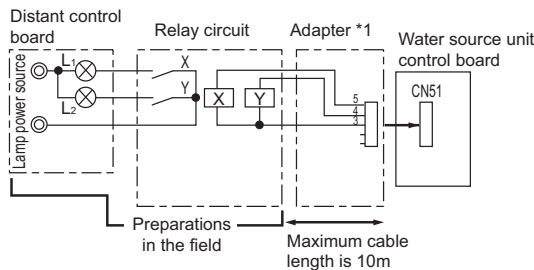


Caution:

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750V or more.

4-4-1. Output

- State (CN51)



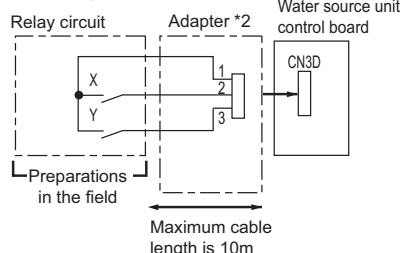
L1 : Water source unit error display lamp
L2 : Compressor operation lamp (compressor running state)
X, Y : Relay (coil $\leq 0.9W$: 12VDC)

*1. Optional part : PAC-725AD or field supply.

4-4-2. Input

- (1) Step demand and Low noise mode (CN3D)

For details, refer to "Table 4-1-1".

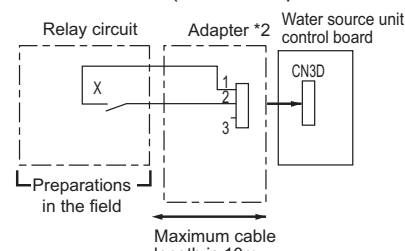


X : Low noise mode or demand
Y : Demand

X, Y : Relay Contact rating voltage $\geq 15VDC$
Contact rating current $\geq 0.1A$
Minimum applicable load $\leq 1mA$ at DC

*2. Optional part : PAC-715AD or field supply.

- (2) Low noise mode (CN3D + DipSW4-4 OFF)



X : Relay Contact rating voltage $\geq 15VDC$
Contact rating current $\geq 0.1A$
Minimum applicable load $\leq 1mA$ at DC

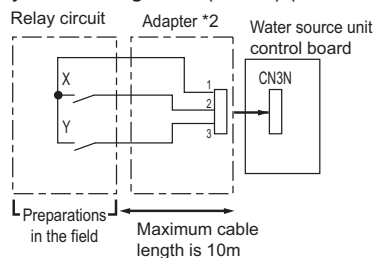
*2. Optional part : PAC-715AD or field supply.

Low noise mode : The sound pressure level is reduced by controlling the maximum fan frequency and compressor frequency.

-Note-

The sound pressure level can not be reduced, when neither the fan frequency nor the compressor frequency are maximum.

- (3) System Changeover (CN3N) (WR2 excluded)



X : Cooling / Heating

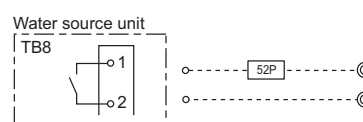
Y : Validity / Invalidity of X

X, Y : Relay Contact rating voltage $\geq 15VDC$
Contact rating current $\geq 0.1A$
Minimum applicable load $\leq 1mA$ at DC

*2. Optional part : PAC-715AD or field supply.

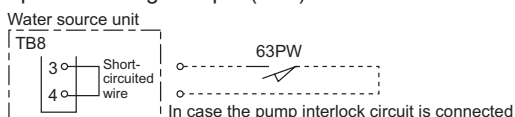
		X	
		OFF	ON
Y	OFF	Normal	
	ON	Cooling	Heating

- (4) Operation ON signal (TB8)



X : Relay (Contact rating 200VAC 1A)
52P : Pump contactor

- (5) Pump Interlock signal input (TB8)



When connecting the pump interlock circuit to terminals 3 and 4 on TB8, remove the short-circuited wire.

63PW : Pressure switch (Contact: Minimum applied load 5mA)

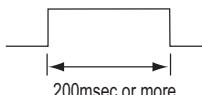
4-5. Indoor unit “-E” type input/output connector



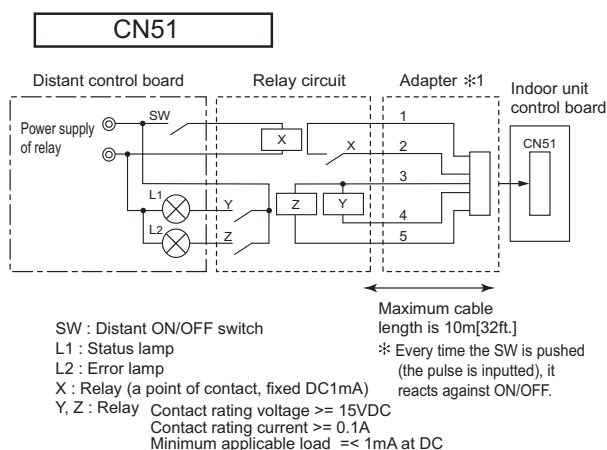
Caution:

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750V or more.

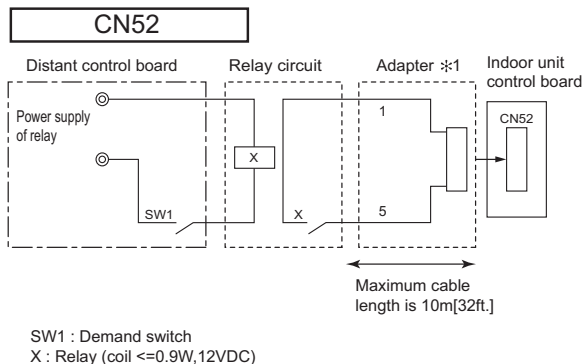
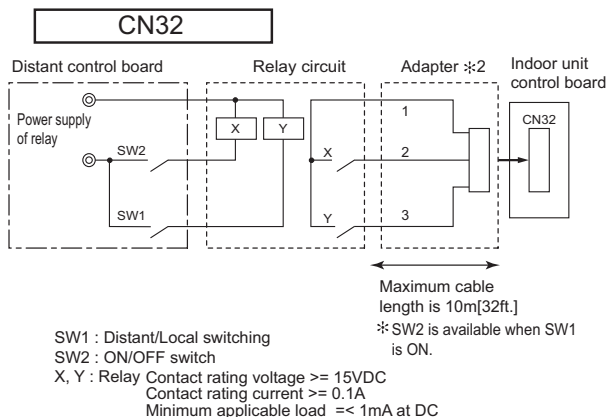
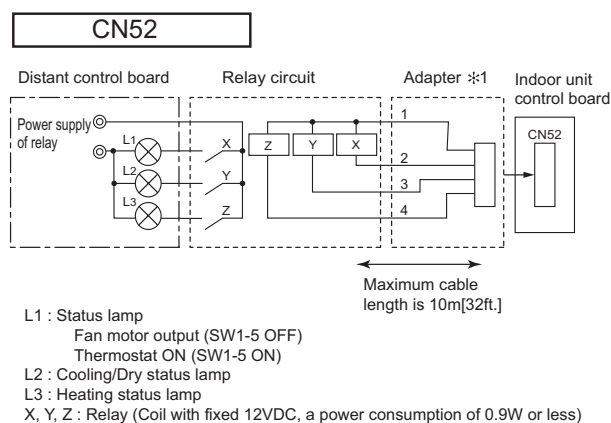
● ON/OFF (Pulse) input specification

Item	Description
Input signal	Pulse sign (a connect)
Standard of pulse	

● Input



● Output



SW1	Indoor unit
ON	Forced thermo-OFF
OFF	Normal running

- * 1. Optional part : PAC-725AD or field supply
 * 2. Optional part : PAC-725AD or field supply

